THE IRON AGE

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Electroplating at a Typewriter Works

Details of Copper and Nickel-Plating Equipment at the Works of the Underwood Typewriting Machine, Hartford, Conn.

BY JAMES STEDMAN

In the works of the Underwood Typewriter Company, Hartford, Conn., is one of the largest nickel-plating plants in the world. Nearly everything that is nickeled there is of very moderate size, many articles almost minute. In a typical Underwood typewriter, there are about 1600 different parts. Of these, about 1200 are nickeled. As the daily output is over 500 complete machines per day, we readily calculate that the nickeling plant must care for about 600,000 articles every day. But this is not all, they nickel miscellaneous parts in sufficient quantity to bring the daily total up to the neighborhood of 800,000 articles.

View in One of the Electroplating Rooms, Showing the Overhead Busbars

Two broad rules govern their nickel-plating procedure: 1, nearly everything is first plated with copper; and, 2, the nickel is deposited slowly. The underlying materials are gray cast iron, rolled steel, brass, German silver, gun metal. For all of these in general, the rule as to a preliminary coating with copper is carried out. By slow deposition of nickel, they seek to secure a fine, close-grained film. Copper is employed by them more, it would appear, as a protective coating, than as a means of securing firm attachment of the nickel. In addition to nickel-plating, the same concern does an amount of copper-plating which is to receive a dark finish. It will be seen from the foregoing that the plating plant must be a very considerable one with respect to copper as well as nickel.

All the plating is done in two rooms. The principal one is perhaps 70 x 100 ft. in area. In it are located 57 tanks or vats each having a capacity of 300 gal. Thirty-two of these are devoted to nickel plating; the remainder to copper plating. In the smaller plating room, having a floor plan of about 25 x 25 ft., are 4 nickeling tanks and 1 copper plating tank. In addition, there are several rotary plating machines and a number of tanks devoted to the copper plating side of the work, four of these vats being used for hot solutions. Altogether, there are more than three score plating baths, nearly all of which are of the 300-gal. size. These standard tanks are quite deep; sufficiently so in fact to provide a space at least 1 ft. deep between the work and the floor of the vats. Much of the work is still further removed from the bottom. This arrangement is considered of importance in connection with the production of high quality work. The need for this space proceeds from the more or less necessary accumula-

tion of débris. For example, the metallic nickel employed for anodes in the bath may be very pure, but it is not absolutely so. From this source, and perhaps others, a sediment is deposited on the floor. The introduction of work is likely to disturb this solid material with the result that the plating will disclose rough places.

In the standard plating vats, three lines of anodes are employed; one line along either side, and a third line arranged between these two. In consequence, each vat has two plating compartments. The central anodes will, of course, need to be heavier than the others or will require renewal oftener, being consumed for two charges of work.

The current for the principal room is generated by two dynamos located just outside in an adjoining room. The voltage is, of course, low, while the amperage is about 3800. On the nickel side, it is brought in by means of a line of copper bars which stretches clear across the 70 ft. of room width to the opposite wall and begins its return toward the dynamo before it is tapped to supply a single vat. This is in accordance with a usual scheme of conductors to maintain the same voltage drop through all electroplating baths. The conductor in its largest parts consists of 7 single bars, each ⅜ x 3¼ in. in transverse section, having thus a total sectional area of 8½ sq. in. The conductors are carried by a line of wooden posts belonging to the building. They are not specially insulated, the danger of injury being rather small because of the low voltage. The return conductor increases of course in cross-sectional area as the dynamo is approached. The various tanks are connected in parallel, that is to say, all the anodes are connected with the positive conductor; and all the cathodes with the negative one. The connections between anodes and cathodes on the one hand, and with the conductors on the other is made by means of 1-in. and ¾-in. round copper bars. Eleven tons of copper inclusive of the small connecting rods were required for the conductors for the whole room.

The anodes of copper and of nickel are hung from the sides of the vats and from a middle bar extending across the top from end to end. The work is suspended from round brass rods paralleling the lines of anodes. Ordinarily, small copper wire is employed to attach the work or the receptacles containing the work to the brass rods. It is accordingly necessary that the electrical connection between rod and wire should be quite perfect. To secure this, it is requisite that the rods be kept bright—as, by the frequent application of emery cloth. The brass rods are perfectly loose and merely rest on horizontal portions of the cathode connection.

The work itself is put in wire baskets, or on special racks, or is in some similar way made the actual cathode in the electrolytic bath. When the current passes, nickel or copper is deposited on the work. Other things being equal, the rate of deposition is precisely proportional to the amperage or current. So, also, the amount deposited is precisely proportional to the time occupied, all other conditions remaining constant. We can get a heavy deposit in a short time by sufficiently increasing the amperage. As already suggested, there is objection to this in the case of nickel plating, because it is thought that rapidly deposited nickel is more or less porous or coarse grained. Using a low current and a more protracted time, very satisfactory results are obtained. As between copper and nickel, the rate of deposition is nearly the same, other conditions being equal. Copper is deposited somewhat more rapidly. In 1 hour, 0.042 ounce of copper can be deposited per ampere while 0.038 ounce is the corresponding weight of nickel. In practice, however, where the advisability of securing a slow deposition of nickel is observed, the plating with copper is a much quicker procedure.

Rotary Electroplater for Small Parts

Buffing Department with Dust Exhausting and Chairs for Employees

But various things may interfere to reduce the amount of deposition below the calculated amount. If the anode is smooth or compressed, we may expect less efficient action than where it is rough or more loosely bound together internally. Actual experiments have been tried with rolled, rough cast and smooth cast anodes. The metals were copper and nickel. The rolled anodes were quite inefficient, and the smooth anodes of cast metal were inferior to the rough ones. In short, the rough cast anode appears to be the best of all. The Underwood Typewriter Company uses for nickel anodes rectangular plates having dimensions of about 24 x 8 x ¾ in. The thickness varies somewhat, being greatest between the longer sides. These plates are rated as 92 per cent. pure; they are put 21 into a single vat, 7 in each line.

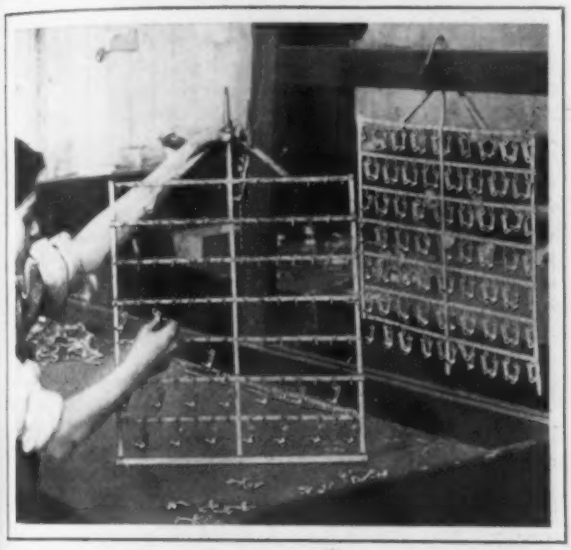
The copper side of the large plating room has its own dynamo for the cold copper plating tanks, 25 or more in number. Nearly all of these are of the full 300-gal. size. Here also a considerable depth is allowed. In addition, there are 4 copper tanks where a hot solution is employed. The hot tanks are used largely in connection with copper plating for preliminary purposes. These hot tanks together with certain cleaning vats are run from a special dynamo. Two currents may be obtained simultaneously from this generator—one at 5 volts for the hot copper tanks and one at 10 volts for the cleaning vats.

The cleaning vats are of especial interest, being electrically operated. The vat itself is of steel or iron and constitutes the cathode; while the work to be cleaned is the anode. An insulating framework is used to support the work. When the current is on, bubbles of gas are disengaged and rise to the surface. This action seems to indicate that the cleansing operation is being performed through the agency of the disturbances set up by the electric current. In this way, grease and other impurities are removed from the surface of the work, thus preparing it for the plating operation.

A most important feature connected with the plating procedure is the preparation of the work for the bath. Some of the articles are so small and are otherwise of such a character that it is only necessary to put them into wire baskets. There are numerous other pieces which can not be handled thus. For example, the type-bar segment is a part of such size and form as to be unsuitable for

handling in this manner. Consequently, four or five of them are strung on copper wire in such a way as to make a kind of rope ladder with the segments for rungs. It is very desirable that there should be absolute separation of one segment from another. In the case of this particular piece and others also, the simplicity of the method of wiring and the comparative fewness of the separate parts to be handled make the use of copper wire fairly economical. There are other parts, however—as, for example, the type bar—which occur in such numbers that the amount of wire involved would be very considerable, to say nothing of difficulties of stringing such pieces together. The Underwood company has accordingly sought convenience and economy in developing methods of assembling duplicate parts on special racks.

The bells used on the typewriters are put on racks provided with numerous spikes. Advantage is taken of



Racks Used for Holding Small Parts in the Electroplating Bath

the fact that each bell has a hole through its center. It is a simple matter, of course, to put a bell on each spike. But it is necessary for some work that there shall be no looseness. For this reason, the spikes are tapered in the region of the tip. A slight turn when the piece is about in position serves to secure it with sufficient firmness. So also in removing the work from the rack, the taper allows quick disengagement. As the spike device is used by this company for a number of applications and is suited to considerable application outside the typewriter business, the method of preparing the rack will be of especial interest.

Each horizontal line of spikes consists of projections from a metal strip running from side to side of the rack. The strip and its spikes are a single piece of sheet steel. The method of making it is substantially as follows. A pair of dies are prepared to cut out a rectangular hole, the rectangle having rounded corners. When these dies are ready, a rather long piece of sheet steel whose width is perhaps 1 or 1¼ in. greater than the width of the hole to be cut is fed longitudinally through the dies, with the result that a piece of ladder-like form is made. The whole is then cut into two parts along its longitudinal axis. The narrow strip at the bases of the series of spikes in each half is bent to a right angle along a longitudinal line. The spikes may be given additional stiffness by twisting each one through a partial turn round its own longitudinal axis. By attaching a number of such rows of spikes to a suitable frame, an efficient rack is formed. Further, the other side or face of the same frame may often be used simultaneously. There are, of course, other methods of constructing spike racks than by stamping out of sheet steel. However, whatever method of making such a rack may be adopted, it will at times be necessary to adopt special methods of retaining the work in a sufficiently fixed position.

The key lever is a most peculiarly shaped piece. It is long and straggling. Not very far from the center is a hook-like projection, the hook being in the same plane with the main body of the key bar. Advantage is taken of this projection to use a rack provided with numerous slots. There is a kind of T-bar arranged horizontally, which has a row of slots in each flange. As between the two rows, the slots are staggered. The key bar is hung on the T-bar, the hook and the slot being made to co-operate. But merely arranging the key bars thus is by no means sufficient. They would doubtless contact with each other for one thing; and might indeed come off the support altogether during the necessary handling operations. However, all hooks from both rows extend across the double flange of the T-bar. A rod is accordingly detachably secured in position above the hooks, holding them with sufficient rigidity.

The comb used on the typewriter is a flat metal piece of a form to justify its name. There is a hole at one end, so there is an opportunity to mount them on rods. A long strip is provided with cross-pieces projecting on either side. The rods to carry the comb are, when in position, arranged parallel to the strip outside of and a little above the row of cross-pieces. The combs are strung on the rods and so arranged that the cross-pieces act as separators.

The use of such devices as those described has enabled the Underwood Typewriter Company to reduce materially its expense for copper wire. At one time, this concern was using about 500 lb. of wire a month for the purpose of preparing the work for the plating bath. No doubt, present methods have resulted in an additional saving because of a reduction of the labor involved in preparing the work. Without doubt, too, present methods secure a greater compactness in the arrangement of the work about to be plated and thus utilize the plating baths to greater advantage.

There is one considerable disadvantage of the usual method of nickel plating which interferes with the quality of the plating in certain classes of work. When bath and work are both stationary throughout the operation, a certain amount of roughness or unevenness is likely to result under some conditions. So, methods have been devised to give a relative movement between bath and work. At the Underwood factory, there are three mechanical plating apparatus, all of the same general design. Partially submerged in the bath is a rotatable barrel mounted on a metallic shaft passing through its center parallel to the axis. In cross-section, the barrel has a polygonal form. The framework is of wood, and the plane surfaces of perforated celluloid. The work is placed in this barrel and slowly rotated while the current is on. The anodes are arranged in curved forms, two corresponding anodes making up a shape similar to that of a horseshoe. In cross-section these anodes are lenticular in form. The curved arrangement secures an approximate equality of distance between work and anode. This is, of course, rather important. The class of work done by the Underwood company by the mechanical plater includes the little shells surrounding the keys and known as key rings. All pieces are small, but they are parts requiring a fine finish. On the copper side, two barrel platers are employed. The anodes are of the same form as with the nickel plater. The barrels are all of about 2 ft. in length, and have a diameter of perhaps 14 in. For nickeling, a period of about 1 hr. is required; for copper plating, about 45 min.

The Underwood company constructs a special machine for salt water service, where an exceptional resistance to corrosive action is desired. In these machines, many parts that would ordinarily be of steel or the like are made of bronze. This is then copper plated and finally oxidized.

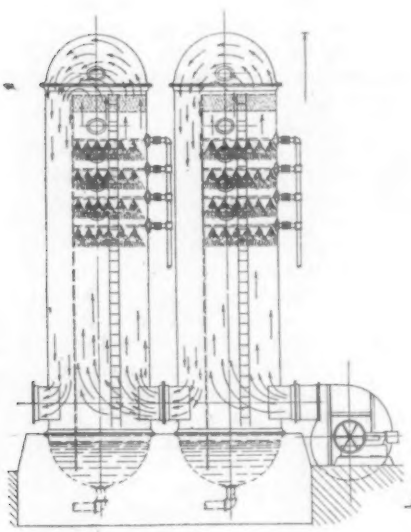
The polishing of parts that have been plated is an important matter. The company uses a machine of special design, both for buffing and for grinding. There is a long double spindle driven by a pulley mounted half way between the ends. In operation, these machines are almost silent although driven at high speed. The drive of a considerable group of these devices is accomplished by a long shaft arranged beneath the floor. Large pulleys mounted on this shaft are belt connected to the little pulleys on the spindle. An idle pulley arranged in the inclosed stand of the machine can be operated to tighten the otherwise loose belt. The spindle is accordingly stopped by moving the control lever so as to withdraw the pressure of the idler. An exhaust system is employed to carry off the powder and dust from the wheels. The operatives do not look sickly and emaciated. A considerable number of women are employed on the buffing machines. All of them, the author was told, had been engaged on this work for five or more years.

Drying Air for the Blast Furnace

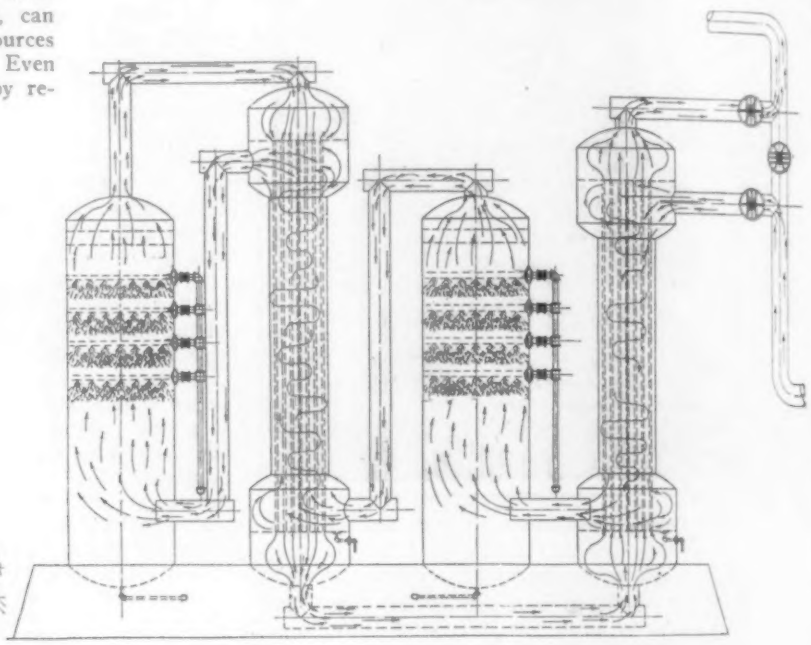
Use of Water Sprays Before and After Compression

Some time ago J. I. Lyle, of the Carrier Air Conditioning Company, New York, presented a paper to the American Society of Refrigerating Engineers on atmospheric dehumidifying. He submitted two diagrams covering high utilization of heat, or exchanging, when cooling the air to rid it of the water vapor. One of these indicated the scheme of apparatus when cooling the air prior to its delivery to the blowing engine, and the other the arrangement when cooling the air after leaving the blowing engine. What he had to say on this subject is as follows:

The latest designs for dry blast plants are making use of the direct spray tower, which is the most efficient form of cooling apparatus, as it allows for a counter-current effect. Water, sufficiently cold to perform a considerable part of the cooling, can usually be obtained from natural sources for the first stage of the work. Even where the water has to be cooled by refrigeration, a very high ammonia suction pressure can be used, thereby greatly reducing the size of ammonia compressor required, and the power consumed.



Dehumidifier on Suction Side of Blowing Engine



Spray Dehumidifier with Interchanger for Use on Compression Side of Blowing Engine

If the dehumidifying is being done on the suction side of the blowing engine, and much less than 2½ grains of water vapor, corresponding to a dew point of 36 deg. F., is to be carried by the air leaving the apparatus, water cannot be employed in the final stage. In such cases a spray of calcium brine is employed in the final stage. The brine is kept at a constant specific gravity by passing a small portion of it continuously through an evaporator or vacuum pan similar to those used in the manufacture of sugar, an open evaporator being used where live steam is employed for the concentration, and a vacuum pan where exhaust steam is used. By maintaining a constant vacuum, and thermostatically regulating the temperature of boiling, the strength of the solution can be uniformly maintained. The advantages over the coil or surface type of dehumidifier for this work are: 1, reduction in amount of power required; 2, reduction of first cost; 3, reduction in space required, and 4, the constant and uniform condition of the air supplied to the furnace.

One of the illustrations shows a set of cooling towers for a dry blast plant for a blast furnace where the dehumidifying is done before the air is compressed, making use of water in the first stage to reduce the air to a temperature of 39 deg. F., and of calcium brine in the second stage further to reduce it to 24 deg. F., and a content of 1½ grains of moisture per cubic foot.

In a large number of dehumidifying installations it is desired to heat the air after the moisture contents have been fixed. In such plants the use of a heat interchanger will effect a considerable economy in operation. This apparatus is really a very simple device, consisting of a number of tubes, on the outside of which passes the incoming air on its way to the final cooler, while the air leaving the cooler passes through the tubes in the opposite direction. The interchangers take up considerable room, but can be made to do 25 per cent. to 35 per cent. of the total work, often effecting a considerable saving in first cost, as well as reduction in refrigeration and power.

In one installation the plant operates at 110 tons capacity. Thirty-two tons is done by well water, which is procured at 56 deg.; 30 tons is done by the interchanger, and the remaining 48 tons by refrigeration. The artificially cooled water enters the dehumidifiers at 33 deg. F., and the compressors run with a suction pressure varying from 35 to 40 lb. The dew point, or the temperature at which the air leaves the final dehumidifier, is automatically controlled by by-passing a portion of the water around Baudelot coils and mixing it with water which has been cooled, thus procuring the proper temperature for the work required.

In blast furnace work a great saving of refrigeration is effected where the moisture can be removed after the air has been compressed. The dew point for a given weight of water vapor in a given space is dependent upon the vapor pressure, and not upon the air pressure. By compressing the mixture of air and water vapor, the dew point required for the same final relative weights of vapor and air will be raised. To illustrate: If it is desired to reduce the water vapor to 2 grains per cubic foot of free air, and the dehumidifying is done at atmospheric pressure, it is necessary to reduce the air to a temperature of approximately 30 deg. F. If, however, the air is compressed to double the absolute pressure, it will occupy only one half the space, and it will be necessary to cool the air only to a dew point of approximately 50 deg. in order to reduce the vapor content to the same weight per pound of air.

The total work required after compression is much greater, as the heat of compressing the air must be removed in addition to that necessary to produce the required condensation. The elevation of the temperature plane not only allows of a high suction pressure at the ammonia compressor, with the resultant increased economy, but it also makes it possible to do a very large portion of the work by water from any convenient source, such as rivers, lakes or wells. The colder the water available, the less refrigeration is required. One reason this method has not been more popular until recently is that any variation in the air pressure causes a variation in the amount of moisture carried to the furnace.

There are two systems of dehumidifying under pressure which have been designed for blast furnace application, only one of which, I believe, has been put in operation. In both of these systems the work is done with sprays. In one, invented by David Baker, a constant air pressure is maintained in the dehumidifier by a regulating valve placed in the blast pipe leading to the furnace, and a constant dew point is regulated by a thermostat. The other system, invented by John B. Miles, provides for varying automatically the dew point temperature of the air leaving the dehumidifier, in relation to the variations in the air pressure to procure a constant relation of the weight of water vapor and air. The relation between the air pressure and the dew point required is a variable, and an automatic regulator invented by E. T. Murphy and the author is used to maintain this relation.

By interposing an interchanger between the first stage using natural water and the last stage using refrigeration, 30 to 35 per cent. of the remaining work can be done without costing more than refrigerating apparatus displaced, and with no operating expense. The third stage, using water or brine which is artificially cooled, reduces the air to the final dew point required. The dew point, however, is not so low as is the case with an atmospheric pressure. With compressed air the efficiency of the interchanger is greatly increased, due to a greater density. With an interchanger having the same first cost as the refrigeration which it displaces, the refrigeration required is reduced to 30 to 40 per cent. The second drawing shows a dry blast plant designed for doing work after compression, using vertical tower and interchanger. The principal advantages of dehumidifying for blast furnaces on the compression side of the blowing engine are: First, the large amount of work which can be done by water from natural sources; second, the high efficiency of an interchanger; third, the high ammonia suction pressure; fourth, a very low first cost; fifth, small space required, and sixth, low cost of maintenance.

The Cincinnati No Strike Association

Address by Former Minister of Labor King, of the Dominion of Canada

The No Strike Association of Cincinnati, Ohio, which is working in the interests of industrial peace, gave a banquet in honor of Hon. W. L. Mackenzie King, former Minister of Labor, Dominion of Canada, on the evening of September 18, at the Hotel Sinton. In Mr. King's address he said he had not come to point the way to the solution of any problem which Americans had not solved for themselves. He believed, however, there was enough similarity between the people north and south of the international frontier, and the problems confronting each, to make the experience of the one country of value to the other, and it was to give, for what it was worth, Canada's experience under its industrial disputes investigation act that he had accepted the invitation to address the association. The provisions of the Canadian act he described as follows:

The Canadian Industrial Disputes Act

"The act provides that where a strike or lockout is threatened in any one of these industries, before such a strike or lockout can legally take place, the parties must refer their difference to a board for settlement. The act provides machinery by which they make this reference. Each party, the party about to strike, or the party about to lockout, must serve a notice informing the government that unless a board is appointed a strike or lockout will take place; that they have exhausted all possible means of arriving at a settlement between themselves, and that they ask the government to appoint a board. The notice served on the government contains a statement of the differences and a copy of that statement is required by the act to be sent to the other party to the dispute.

"The Minister of Labor then calls upon each of the parties to name a member for the board. The men who are applying or the company that is applying, in the first instance, names one member; the opposite side names a member, and these two meet to agree upon a chairman. If they are unable to agree upon a chairman within a specified time, the Minister of Labor appoints a chairman, or, if either party fails to name a member of a board, the Minister of Labor appoints some one to act in the place of the party not making the appointment. This board, when appointed, has almost the powers of a court. It may compel the production of documents; it may subpœna witnesses; it may take evidence under oath, but its duty is primarily that of a conciliation board in the first instance, and a board of mediation, and only secondarily that of a court.

"There the function of the government ends. There is nothing in the act which compels the acceptance of this particular award. It is not compulsory arbitration. It is simply compulsory investigation. There is no restraint upon the parties. Once they have had this inquiry in the matter of whether a strike or lockout shall take place, they may do just as they please about it; but the act has this feature to it, that if the public is subjected to the inconvenience of the cessation of operation in mines or upon railroads, the public knows what the trouble is about, and what, in the opinion of men who have been appointed to look into it, appears to be the right and the fair thing to do."

Results Accomplished in Canada

As to the practical results accomplished under this method of preventing industrial disputes, Mr. King said:

"A complete record of the operation of the act from the end of March, 1907, to the end of March, 1913, shows that during that time there have been 145 applications for boards. Of these, 40 have had to do with coal mining, 11 with metal mining, 61 with railroads, 13 with street railroads, 7 with shipping, 2 with commercial telegraphers, 2 with telephone workers, 4 with civic laborers, and 5 with industries other than mines or public utilities, such as the boot and shoe industry, which may come under its provisions if the parties acquiesce. Of the applications for boards received during those six years, strikes were averted or ended in all cases save 18. There have been isolated cases where men have struck without knowing that the act was on the books, but in these cases the differences have been settled under the law almost immediately after its provisions became known.

"Of these 145 cases, 18 were settled after application had been made for a board, but before a board was actually appointed. This is an evidence of the restraining effect of such an act. In these cases, either one or the other of the parties to the dispute realized that they did not have a good enough case to take before a board, and were prepared, therefore, to make a settlement without further investigation. For the same reason, the actual effect of this law is probably very much wider than the figures seem to indicate. There were cases in which, under former conditions, strikes or lockouts would have taken place, but which, because of the fear of publicity, through investigation, have been settled and smoothed away by an agreement between the men and the companies without even an application for a board. It is impossible, of course, to assume, with any degree of accuracy, how many disputes have thus been privately settled which, in other years, might have become serious.

"If the act had done nothing more than perceptibly to minimize the yearly average of industrial disputes, it would be deserving of being classed not only as a successful piece of legislation but as a law that had conferred upon the people of the whole Dominion a security in industrial affairs hitherto unknown. But it has done more than this; it has maintained industrial peace to a degree the money value of which it is impossible to estimate."

Mr. King commended the bill drafted by Albert A. Huseman, counsel for the No Strike Association, and modeled on the Canadian act, expressing as his opinion that if it were enacted into law by the State it would go a long way toward successfully effecting the end it was intended to serve.

The Drewitz Works of the Orenstein-Arthur Koppel Company, Berlin, Germany, recently celebrated the completion of the 5000th locomotive. This company, established in 1876, has devoted itself to light railroad equipment for industrial plants. It has a capital of $11,250,000 and 12 plants in various parts of the world. The Drewitz works were established in 1899.

A Horizontal Surface Grinding Machine

New Pratt & Whitney Machine for Surfaces in Different Planes

For grinding flat surfaces and more especially for work where the surfaces are of various hights and angles, the Pratt & Whitney Company, Hartford, Conn., has developed a 4-ft. horizontal surface grinding machine. This machine is designed to supplement the company's well-known machine with a cup wheel, which has been used almost entirely on work where the surfaces to be ground were all in the same plane. There is, however, a large amount of work which cannot be handled with a cup wheel in this way, due to the fact that the surfaces to be ground are of different hights, and it is pointed out that up to the present time grinding operations of this character have been a slow and expensive process. Fig. 1 is a front view of the machine, while a partial rear view, showing the driving arrangement, is given in Fig. 2.

As is the custom in machines of this character, the bed is of massive proportions and is reinforced by internal bracing. The design on the whole is compact, the various units being located so as to be readily accessible. Wide bearing surfaces of the V and flat type are provided, and the ways are automatically oiled by rolls located in the bed and convenient to reservoirs. The rear of the bed is surrounded by a pan for collecting water and receiving the chips. The dimensions of this pan, which is readily accessible for cleaning, are liberal.

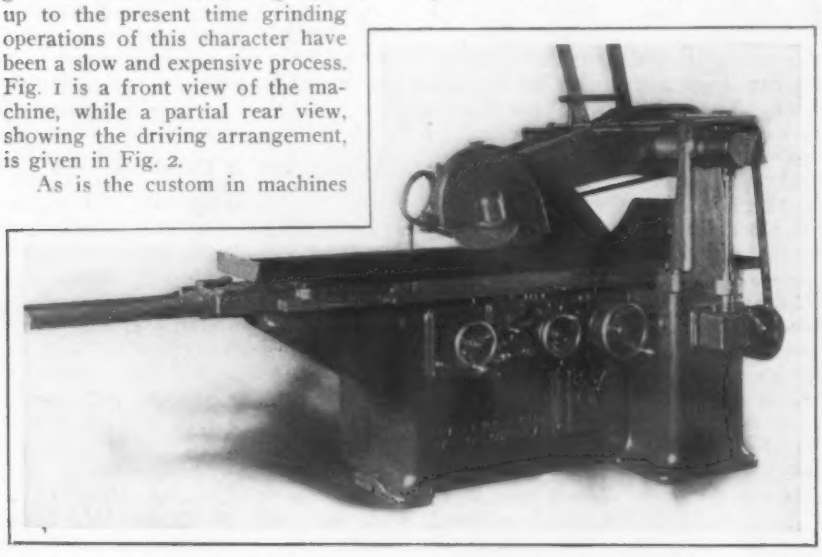


Fig. 1—Front View of a New 4-Ft. Horizontal Machine Developed Especially for Grinding Flat Surfaces at Various Hights and Angles

The table, which has a working surface of 11⅜ x 48 in., is heavy and is ribbed in a manner similar to the bed to prevent warping. As the table is slightly longer than the bed, reliance is placed upon the traveling action to keep these members perfectly true. Guards at each end of the table cover and protect the bearing surfaces from injury. A pan cast integral with the table is provided for controlling the water supply. The distance from the table top to the periphery of a new 18-in. grinding wheel is 15 in. The maximum travel of the table is 48 in., which is also the maximum length of work that can be handled. The maximum width of work which can be accommodated is 12 in., all these dimensions being modified when magnetic chucks are used. The table is provided with automatic reciprocating motion to give any length of stroke up to 4 ft., the length being regulated by adjustable table dogs. The table feed mechanism is made in a simple compact unit and two rates, namely, 34 and 102 in. per min., are provided. Both of these are controlled instantly by a lever located at the front of the machine, and when this lever is adjusted to the central station it serves to stop the table. In the upper position the slow feed is engaged, while the fast feed is engaged when the lever is in the lower one. A vertical rack and pinion drives the table, reliance being placed upon the construction to eliminate the possibility of vibration showing in the finished work.

Both hand and automatic horizontal feeds are provided for the wheel; while both the table and the horizontal wheel power feeds are engaged through the same trip, the units are entirely independent of one another. Emphasis is laid upon the fact that by having a separate mechanism for each feed, there is no extra load thrown upon the table feed mechanism, when the wheel feed is engaged. The horizontal power feed of the wheel ranges from 0.01 to 0.50 in., while the hand feed is 2 in. per revolution of the handwheel or 1 in., depending upon whether the fine or coarse feed is in use. The feed mechanism operates a screw mounted within the hollow arbor upon which the arm is mounted. The screw engages a nut clamped firmly to the arm and both the screw and nut are readily accessible. As will be noted the feed mechanism is entirely inclosed, and any variation in the rate of feed is readily obtained by a ratchet wheel and pawl. The feed is operated in either direction, it being governed by the direction in which the feed pawl is engaged. If through neglect to disengage the feed mechanism, the arm is permitted to come in contact with the uprights a safety device is provided which prevents injury to the feed mechanism. A handwheel, the periphery of which is graduated in thousandths of an inch, also provides an accurate means for governing the feed. At the end of each stroke, when the grinding wheel is entirely clear of the work, the feed is automatically disengaged. The vertical feed for the grinding wheel is operated by hand only, and is at the rate of 0.04 in. per revolution of a graduated handwheel which is located on the front of the machine.

The grinding wheel is raised or lowered by a semi-vertical ram which is rigidly supported in long bearings. The construction is such that the ram is raised or lowered by a heavy screw and nut, the screw being driven through a worm and worm wheel that is actuated by the handwheel. A hardened and ground plate is mounted on the top of the ram, which engages a similarly treated block on the under side of the arm, the construction being such that the block always has full contact with the plate, irrespective of the hight or the horizontal position of the wheel. The ram and the block take the full weight of the arm, which, it is pointed out, eliminates entirely the back lash in the mechanism, and is an important feature directly conducive to accurate work.

The wheel is mounted in an arm that has a perfect fit on an arbor which is substantially supported on two uprights. This original arrangement, it is pointed out, eliminates the objectionable slide construction. Both the

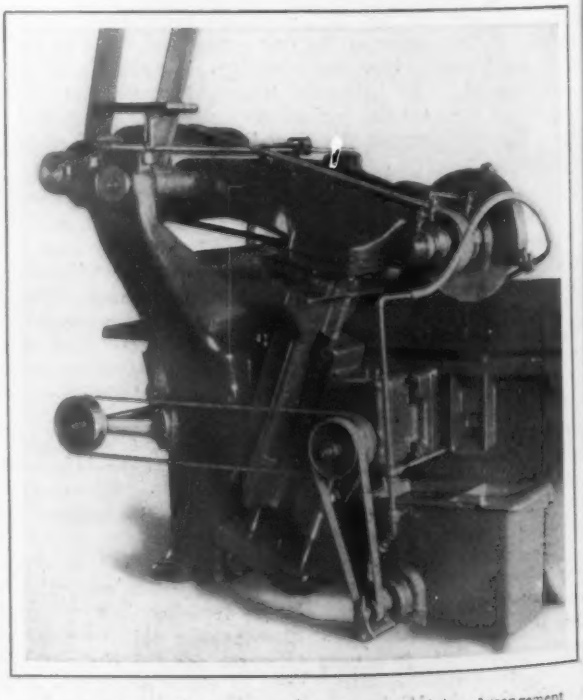


Fig. 2—A Partial Rear View Showing the Driving Arrangement

arm and the arbor are proportioned to give strength and rigidity, and emphasis is laid upon the fact that with this construction there is no overhang for the wheel. It is also possible to control the vertical and horizontal feeds easily. The bearing of the arm upon the arbor is liberal, the surface being protected by wipers.

The wheel spindle is of hardened, ground and lapped tool steel. The bronze bearing boxes are mounted in conical seats and are so designed and located as to be readily accessible for adjustment, while at the same time they are both dust and waterproof. The wheel mount is self-contained and is constructed to hold the wheels firmly and perfectly true. The end of the spindle is made conical and has a key for the accommodation and positive driving of the wheel mount.

The machine is designed to use wheels up to 18 in. in diameter, with a 2-in. face, although if desired wheels with a 1-in. face can be used in connection with the packing rings which are provided. When the narrower wheel is used, there is, of course, a slight reduction in the amount of surface which can be covered. The wheel spindle drive is designed to provide sufficient power for the wheel for any duty that will be required of it. There are two wheel speeds provided, namely, 1300 and 1600 r.p.m., by the use of a two-step cone pulley, the speed of the wheel being increased as its diameter is reduced by wear. The diameters of the two steps of this cone pulley are 20 and 18½ in. respectively, the width of both being 5¼ in. The mechanism for shifting the belt to obtain an increased wheel speed is designed so that it becomes necessary to decrease the table feed proportionately, thus giving a constant table feed, irrespective of whether the fast or slow feed of the wheel is being used. The wheel is driven from a drum which is 14¼ in. in diameter by a 3½-in. belt, which runs over a pulley mounted on the wheel spindle. This pulley is 8 in. in diameter and 3¾ in. wide.

A new type of pump which does not require the usual idler pulleys is employed to furnish the necessary supply of water to the grinding wheel. There is a large water tank located on the back of the machine, which is placed in an accessible position, where it can be readily cleaned and also permits the return of the water, without carrying it through pipes. The pipe through which the water is conveyed from the pump to the wheel is attached to the wheel guard, and can be easily adjusted or instantly removed, as may be desired. The escape of water is prevented by guards which are provided for both the table and the grinding wheel.

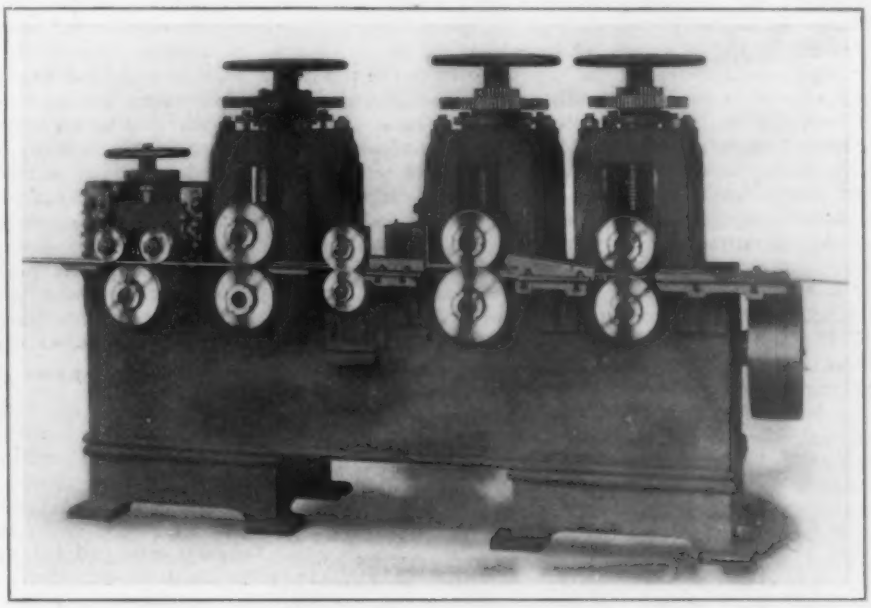
The equipment regularly furnished with the machine includes a water pump and the necessary piping, a grinding wheel with a 2-in. face, a wheel truing device, a set of wrenches and a tight and loose pulley countershaft. When furnished with this equipment, the machine weighs 8450 lb. and occupies a floor space of 6½ x 15 ft.

The successful use of oil toppings in an automobile truck is reported from San Francisco, where on August 27, O. W. Kern finished a run in a KisselKar truck, from Los Angeles, a distance of 472 miles. He made the run in 24 hr. and 40 min., and approximately 46½ gal. of the oil toppings were used, an average of over 10 miles to the gallon. The truck was a 1500-lb. capacity vehicle, and a load of 2000 lb. was carried. It is stated that the fuel cost 3 cents per gal., or a total of $1.40, and 3½ gal. of lubricating oil were used. The oil toppings has a specific gravity of 41 at 85 deg. temperature, and its successful use, it is explained, was due to a new type of carburetor, invented by Harry Miller, Los Angeles.

New Tube Rolling Machine

A new tube rolling machine designed to roll steel tubing from ½ to ⅞ in. in diameter has been brought out by the Etna Foundry Company, Toledo, Ohio. No. 10 gauge steel or as much lighter as is desired can be used. The tubing is rolled by passing the stock through five sets of rolls. After passing through the second set of rolls the material is shaped much like a U. Between the second and third sets the partially formed tubing passes over a mandrel. The third set is an idler set and serves as a guide. The fourth set brings the edges together and completes the circular roll. The last set at the left in the illustration are the straightening rolls. The tubing comes from the machine in a straight line ready for brazing.

The lower roll shafts are driven directly by worms on the main shaft. These lower roll shafts drive the upper roll shafts by means of spur gears. The rolls are adjusted by means of hand wheels and screws with which the upper roll shafts are moved up and down in their double housings and kept parallel to the lower roll shafts. The forming rolls are of hardened tool steel 8 in. in diameter. The main bearings and all of the roll bearings are bronze bushed. The worm bearings are solid bronze. The machine is 8 ft. long, 5 ft. high and 3 ft. wide and weighs approximately 4800 lb. It is stated that it has a capacity for rolling 45 ft. of tubing per minute.



Machine Making ½ to ⅞-in. Tubing from No. 12 and Lighter Steel

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The historic West Point Foundry, at Cold Spring, N. Y., will shortly be a thing of the past. George B. Douglas, 29 Broadway, New York, has purchased for account of principals the old machine tools and equipment with the intention of dismantling. This plant was established in 1817. Designed with a view to the production of war material, the United States Government was then interested in it. It was originally driven by water-power from an overshot wheel, still to be seen. In it is understood to be the first Whitworth shaper imported into the United States. During the Civil War much work was done for the Government, including the then famous Parrott rifled cast-iron cannon. A description of this foundry, including views of some of its old appliances, was given in *The Iron Age* of January 1, 1903.

The Interstate Transfer Railway Company, Superior, Wis., has increased its capital stock from $500,000 to $1,500,000 to provide funds for the construction of the 12 miles of railroad needed to connect its present eastern terminus at Pokegama Junction with the site of the Minnesota Steel Company's new steel plant on St. Louis Bay, south of Duluth, Minn. The company is a subsidiary of the United States Steel Corporation.

Relative Properties of Acid and Basic Steel*

Prejudices Against the Latter Being Removed—First Results of Special Tests Show It Is Lower in Tensile Strength

BY A. CAMPION AND J. G. LONGBOTTOM

The introduction of the basic process for the manufacture of steel caused much discussion among engineers and other users of steel respecting the merits of the material in comparison with that produced by the acid process. Basic steel had to pass through a period of suspicion and prejudice similar to that which acid steel underwent before it was allowed to replace iron.

Due mainly to a lack of knowledge of the reactions by which the removal of the impurities from the pig iron was effected, some of the earlier basic steel proved to be somewhat erratic in character and unreliable. At the present time, when the chemical reactions, and the conditions under which they take place are better understood, and the necessity for strict adherence to certain well-defined working conditions as to temperature and basicity of slag is appreciated, there appears to be no reason for supposing that basic steel is less reliable than acid steel. It is therefore surprising that the old prejudice against the basic material should still exist to so large an extent. H. H. Campbell, in his "Manufacture and Properties of Structural Steel," says: "Acid steel is much better for all engineering purposes. It is almost entirely free from slag and oxide, and its physical properties are far ahead of basic open hearth; indeed, the acid is as much better than the basic steel as the basic is better than the Bessemer." Apparently this opinion is shared by many engineers; some perhaps have good reason for believing it, but others have accepted it as a fact without further inquiry. Each method has its strong and its weak points, and it is exceedingly difficult to understand how material made by either process can be credited with any marked advantage, provided the same care and judgment is exercised in the two processes. In making steel by the acid process it is absolutely necessary to carefully select the pig iron and scrap, as there is no removal of sulphur and phosphorus in this process. On the other hand, the basic lined furnace permits of the use of miscellaneous scrap and impure pig iron, from which phosphorus may be almost entirely, and sulphur partially, eliminated. These facts frequently lead to abuse of the basic open hearth, anything in the nature of iron or steel being considered good enough to charge into the basic furnace, with the inevitable result that the steel is inferior in quality and unreliable.

Discrimination Against Basic Steel

The prejudice against basic steel is so strongly held by many engineers, that they will not accept it although it may fulfil all requirements of composition, strength, and ductility, etc., as determined by the usually specified tests. Others will only accept it after the most rigorous inspection and testing, and on the guarantee of the steel maker to make good any loss in the event of failure. On the other hand, there are many leading engineers and users of steel whose opinions cannot be lightly regarded, who maintain that basic steel is superior to acid steel. This subject of the relative value of steel made by the acid and basic open-hearth processes has been often discussed, but never satisfactorily settled.

The increasing difficulty of obtaining supplies of ores of sufficient richness and purity for the manufacture of pig iron suitable for converting into steel in acid lined furnaces, is likely to cause a much larger adoption of the basic process in the near future. It appears probable, moreover, that at no distant date the bulk of the steel required for constructional work will be produced by the basic process. It therefore becomes increasingly important to obtain an exact knowledge of the influence the process of manufacture has upon the strength and other mechanical and physical properties of the steel. In selecting steel for structural purposes, the first consideration is the strength, ductility and toughness necessary to ensure reliability under the particular conditions to which the material will be submitted irrespective of the method of manufacture.

Although many results of tests have been published at various times with the object of demonstrating the superiority of the one or the other, the results have been inconclusive, owing to the absence of full particulars as to the details of manufacture, thermal and mechanical treatment, etc. Many of these results have been published by parties interested in one or other of the materials, and their conclusions have not always been unbiased. The usual method has been to give the average of a number of tests of each class of material, and often these results have been collected from tests made on material whose previous history was entirely unknown as regards treatment during manufacture, or of variations in size of ingots and finished shapes.

Scope of the Investigation

The authors about three years ago decided to investigate as fully as possible the behavior under various conditions, of steels produced by different processes, with the object of determining in what direction, and to what extent methods of manufacture influenced the physical and mechanical properties of ordinary low carbon steels usually employed for structural purposes. It was desired to carry through the investigation in such a manner that all possible information of the properties of the materials could be obtained. After very careful consideration of the problems involved, the authors determined to submit the material to as many of the following tests as possible.

Static Tests: Tensile tests included modulus of elasticity, limit of elasticity, yield and maximum stress, extension per cent. on various lengths, contraction of area. Torsion tests covered limit of elasticity, modulus of transverse elasticity, maximum stress.

Dynamic or Impact Tests: Tensile tests included energy to fracture at single blow (Charpy), dynamic strength, percentage, extension and contraction of area. Transverse tests covered energy to fracture at single blow on notched specimens (Charpy), energy and number of blows to fracture under repeated blows on notched specimens (Stanton). Fatigue tests covered determination of work done in fracturing specimens and number of right angle bends necessary to produce fracture (Sankey).

Hardness Tests: Determination of hardness numeral (Brinell).

High Temperature Tests: Determination of modulus of elasticity, maximum stress, elastic limit, extension per cent., and contraction of area, at temperatures up to 800 deg. C.

Thermal Examination: The investigation of phenomena occurring during heating and cooling, and determination of the position of the thermal critical points.

Microscopical Tests: Examination of the material before and after thermal treatment, and the examination of the fractures of various test pieces and the mode in which rupture occurred.

Heat Treatment of Specimens

The materials were tested in the condition in which they left the works and also after various heat treatment, as follows: Samples as received, samples after normalizing and samples reheated to 600, 700, 750, 800, 900, 1000, 1100 deg. C., slowly cooled, or quenched.

Normalizing was for the purpose of removing effects of strains set up during manufacture and machining, and consisted in heating the material to 800 deg. C. for one

*Part of a paper read before the West of Scotland Iron and Steel Institute.

hour, and then allowing to cool naturally in the air. All the specimens, with the exception of those tested "as received," were normalized before being reheated to the temperature as described above. Thus—"reheated to and slowly cooled from 600 deg. C." signifies that the material was first heated to 800 deg. C. for one hour, withdrawn from the furnace, allowed to cool in air, and after having become quite cold reheated to 600 deg. C. for the desired length of time and then left to cool slowly in the furnace. The test bars were all machined before being submitted to the special treatments. The heatings, which were carried out in a gas fired reverberatory furnace specially arranged for experimental work, were controlled by a series of thermo-electric and optical pyrometers. The time required to heat the material to the desired temperature and also that taken in cooling from the temperature of treatment to 500 deg. C. was carefully noted; these were in many cases also obtained by means of a recording pyrometer. The specimens during the heat treatment were encased in closed wrought iron boxes luted up to prevent oxidation and scaling of the material. The scheme of work proposed included the examination of plates, bars, and other shapes of various sizes made by acid and basic Bessemer, and acid and basic open-hearth processes. In order to obtain a fair average for each class of material, and to eliminate as far as possible differences due to variations in manufacturing details, it was proposed to examine several sets of each class of material obtained from different works. It was desired to obtain a supply of material made by the acid and basic processes, of as nearly as possible the same chemical composition from each works, and it was hoped that by this means strictly comparative results might at least be obtained for material manufactured at each place. It was very soon realized that the scope of the investigation as originally proposed was much too ambitious for the time at the authors' disposal, and it was therefore decided to eliminate the Bessemer material and to confine the investigation entirely to open-hearth steel.

A number of firms were approached with a view of obtaining material of as nearly as possible the same composition made by both processes, and thus a large number of specimens of plates and bars were placed at the authors' disposal.

The examination of the material was proceeded with, but the investigation had not been long in progress before it became evident that owing to the very small difference in properties exhibited by the two materials, and absence of full information as to details of manufacture, and the position in the mass from which the test pieces were cut, it was quite impossible to obtain a proper comparison of the properties of the materials. The differences obtained were small, in most cases less than is frequently obtained from different portions of a single plate or bar, or between specimens cut parallel to, and at right angles to the direction of rolling. It was therefore considered necessary to first of all examine a large number of specimens taken from different parts of a single plate or bar, and cut both lengthwise and crosswise.

Acid and Basic Steel Plates

Two plates, each 16 ft. 6 in. x 65 in. x 1¼ in., one acid and the other basic steel, and two plates, each 21 ft. 6 in. x 65 in. x ¾ in., one acid and one basic steel, were very fully examined. In the present paper the authors deal only with plates of different thicknesses, and they propose to reserve the question of bars and sections for future contributions.

The plates were cut up so as to obtain test pieces from the ends and middle for the cross tests and from the outsides and middle for the long tests. This enabled an idea to be formed of the variations in each material and of the homogeneity of the plates. It was, as a matter of fact, found that there was a very slight variation in the material and as the set of pieces for each treatment were from different portions of the plate, the means of the results may be considered as truly representative of each material under the particular conditions, and therefore strictly comparable. The tensile test pieces were prepared in accordance with the British standard specification.

A very large number of specimens have been examined in various ways, but as the results have not yet been fully analyzed there are only given in the present paper results of static tension tests, showing ultimate stress, yield stress, extension on 8 in. length, contraction of area, ratio of yield to ultimate stress; also impact tensile tests, showing amount of energy absorbed in fracturing the piece at one blow, dynamic strength, percentage of extension between the shoulders, contraction of area per cent., ratio of dynamic to static strength.

The results are given for three series of acid and three series of basic steel plates, the chemical analyses of which are shown in Table 1.

Table 1.—Chemical Analyses

Description of steel and mark:	Carbon, per cent.	Silicon, per cent.	Sulphur, per cent.	Phosphorus, per cent.	M'ganese, per cent.
Acid plates 1 in. thick	0.179	0.021	0.028	0.044	0.500
Basic plates 1 in. thick	0.182	0.027	0.035	0.035	0.510
Acid plates 16 ft. 6 in. long, 65 in. wide, ¾ in. thick	0.144	0.029	0.036	0.033	0.442
Basic plates, 16 ft. 6 in. long, 65 in. wide, and 1¼ in. thick	0.154	0.028	0.039	0.032	0.450
Acid plates 21 ft. 6 in. long, 65 in. wide, and ¾ in. thick	0.176	0.028	0.041	0.021	0.410
Basic plates 21 ft. 6 in. long, 65 in. wide, and ¾ in. thick	0.166	0.023	0.049	0.036	0.410

[The authors present detailed results of the tests they have made, together with complete tables, but they do not discuss them critically. The data given are extensive and more or less intricate and should be consulted at first hand. As illustration of their general trend, the physical tests on the acid and basic plates 1 in. thick are given in Table 2.

Table 2.—Tests on 1-in. Acid and Basic Steel Plates

Condition of steel	1-in. acid steel: Mean contraction of area, per cent.	1-in. acid steel: Mean extension on 8 in., per cent.	1-in. acid steel: Mean stress, Yield, tons per sq. in.	1-in. acid steel: Mean stress, Maximum, tons per sq. in.	1-in. basic steel: Mean contraction of area, per cent.	1-in. basic steel: Mean extension on 8 in., per cent.	1-in. basic steel: Mean stress, Yield, tons per sq. in.	1-in. basic steel: Mean stress, Maximum, tons per sq. in.
As received	38.4	25.8	14.80	25.96	55.1	31.2	15.20	25.73
Normalized	56.0	33.0	13.29	24.32	52.1	33.1	14.54	24.84
Reheated to and slowly cooled from 600 deg. C.	57.4	31.1	13.03	24.55	58.2	35.6	13.53	23.79
Reheated to and slowly cooled from 700 deg. C.	54.9	33.1	12.68	23.76	56.1	34.5	13.60	23.65
Reheated to and slowly cooled from 800 deg. C.	58.2	35.3	12.68	23.92	56.1	34.4	13.50	23.84
Reheated to and slowly cooled from 900 deg. C.	53.2	32.1	12.10	24.04	53.3	35.1	12.90	23.89
Reheated to and slowly cooled from 1000 deg. C.	52.6	33.0	12.42	23.48	52.1	33.2	12.40	23.52
Reheated to and slowly cooled from 1100 deg. C.	56.7	32.0	11.50	23.45	54.6	31.9	12.12	23.53

At present, the authors state, they are unable to offer a full explanation of the various differences in the results, but hope to be able to do so after their further experiments are completed. It is noted, however, that the tests in all cases after normalizing show a diminution in strength and that at 900 deg. C. there is a superiority in the tests of the acid lengthwise and crossbars and the basic cross tests, while at 800 deg. C. the superiority occurs in the lengthwise tests of the basic steel. An examination of the tables shows that in almost all cases the basic steel has lower tenacity than the acid under corresponding treatment.]

Microscopical Examination

Sections for microscopical examinations were cut from the ends of the test bars after treatment; the surface which was polished was the inside portion in order to make sure that decarburization or other effects due to the treatment should be avoided. The etching was effected by Sauveur's method. The most interesting features of this examination are that in the basic materials the pearlite areas are not opened up in the usual manner by heating and slowly cooling, but there is a very marked tendency to balling up of the carbide with the production of a very dense, dark etching form of pearlite which cannot be resolved even under high powers. These dense pearlite grains have a pronounced tendency to arrange themselves in parallel lines in the direction of rolling of the plate. This balling up and arrangement in strings is particularly marked in the material reheated to 900 deg. C. and higher. The other feature is the peculiar crystallization which takes place in material reheated to 600 or 700 deg. C. It occurs in both acid and basic steel, but is if anything more marked in the acid steel.

Basic Steel Better for Boiler and Firebox Plates

A consideration of the mechanical tests in conjunction with the microscopical results appears to indicate that

basic steel is more sensitive to mechanical treatment than acid steel, but that it is less sensitive to heat treatment and requires a higher temperature and longer time in the furnace in order to remove the effects of work. On the other hand, basic steel is less easily overheated or deteriorated by excessive heating than acid steel. This suggests that basic steel plates would offer considerable advantages for boiler furnaces and firebox plates.

The examination of the materials at high temperatures referred to in the scheme of work was really for the purpose of determining whether acid or basic steel would be more suitable for boiler work. At the present time, when high pressures and highly superheated steam are so largely employed, it is a matter of great importance to engineers to know how the different materials of construction will behave under such conditions. It will be interesting to compare the strength and other properties at high temperatures with those at atmospheric temperatures. Experiments of this nature have been in progress for some time in the Royal Technical College, but they are not sufficiently advanced to be dealt with in this paper, even though it were desirable. The results so far obtained are exceedingly interesting, and the authors consider that they are of sufficient importance to be dealt with in a separate paper.

The authors, after very careful consideration of the results of experiments described in this paper, and of many others which have been made in the Royal Technical College, are of opinion that if impact tensile tests are to be of real value, they must be made on large sized specimens such as are frequently employed for static tensile tests, approaching, say, ¼ sq. in. in area and two in. gauged length. If impact tests are carried out on full sized bars without a notch of any description, strictly comparable static and impact results could be obtained, and almost everything which can be deduced from ordinary static tension tests could be obtained from tensile impact tests on a much less costly machine. The adoption of such specimens would, of course, necessitate the building of larger machines than those at present in use.

The authors in conclusion emphasize what has already been stated, that the results of work which they now have the pleasure to present for the consideration of the members of the Institute represent only a very small proportion of the complete scheme. They, therefore, refrain from offering any definite conclusions as to the respective merits of acid and basic steel; but so far as can at present be seen, the one is as good as the other — at any rate in the form of plates — provided that equal care be exercised in the selection of the material and the working of the steel.

It is proposed to continue the investigation and to complete the scheme of work outlined at the beginning of the paper; and to examine bars and other sections of steel of both varieties and of different carbon contents.

Discussion

In the oral and written discussion the work of the authors was highly commended and some interesting comments were made. James Mitchell, Clydesdale Iron & Steel Works, said that there were one or two very striking things in connection with both the mechanical tests recorded here and the microscopic analyses, which he would like to refer to briefly. He had been struck on examining the analyses, and the tensile results particularly, to find that, in spite of the fact that in two out of the three sets of figures shown the carbon was slightly higher in the basic than in the acid manufactured steel, the tonnage after normalizing was somewhat lower. This, of course, was confirmed in many metallurgical books and papers, where the trend of results was somewhat similar to what the authors had here obtained, namely, that in the basic steel for the same carbon there seemed to be a lower tonnage. His (Mr. Mitchell's) reason for referring to this particularly was that he had had, from time to time, to go into the matter of heat treatment of basic steel, with the microscope. From his experience in this direction, he felt sure that this greater softness arose from the nature of the pearlite. This greater density of the pearlite was a typical feature of all basic steels, and, indeed, he had come to regard it as the normal state of the carbide in the basic material.

In reply to this Mr. Campion said he thought it was pretty well known that a little higher carbon was necessary in the basic than in the acid steel, in order to get a certain strength. He was unable to follow Mr. Mitchell's argument as to the probable cause of the greater softness of basic steel. As a matter of fact if there was more free cementite, or the pearlite was of a more granular variety, the material would be harder and not softer.

C. E. Stromeyer, Manchester, wrote: "The paper is the outcome of an infinite amount of labor. The basic steels give results which differ from those of acid steel in the same direction as these differ from tests on iron plates. Acid steel shows higher tenacities and higher elongations than iron, and because basic steel shows still higher results, it is argued that it is the best material of the three. Users of steel are not convinced, and, pointing to disconcerting failures with basic steel, look almost suspiciously on high test results, for it is an indisputable fact that whereas not a single acid open-hearth steel marine boiler shell has burst since this material was introduced about 1880, there has been a disastrous explosion, s.s. Pahud and other failures at sea with basic open-hearth steel, and in America and Germany, where this material is almost exclusively used, inexplicable explosions are far too frequent to encourage the use of basic steel. My explanation of these troubles is that they are due to nitrogen; careful analyses of a number of failures showing that when the sum of the percentage of phosphorus and five times the percentage of nitrogen (1P+5N) exceeds 0.08 per cent., then the steel is treacherous, i.e., it gives good test results and fails in practice. Now nitrogen can only be introduced into steel and iron when hot and under pressure, and naturally the high blasts in the Bessemer converters impart large percentages, up to 0.030 per cent. to Bessemer steel, while pig iron absorbs only, say, 0.003 per cent. This nitrogen is not driven out of the steel by mere heating, however intense, and if acid or basic Bessemer scrap is melted in an open-hearth, the resulting metal will still contain much nitrogen."

F. W. Harbord, London, wrote: "This paper by Professors Campion and Longbottom will be, so far as I am aware, the most complete investigation which has ever been carried out, either in this or any other country, on the relative physical properties of acid and basic steels. The paper is not only of scientific but of great practical importance to all steel users, showing as it does the effects of heat treatment on the physical properties of steel as determined by all the recognized methods of testing at all temperatures between 600 deg. C. and 1100 deg. C. I shall look forward with special interest to the results of the high temperature tests, as I consider these of great importance, and I hope at an early date the authors will be able to complete the results of their investigation. The recorded experiments are so many, and all their conclusions are based on the results of these, that there is little room for criticism. As regards the static tests, these generally support the results I obtained some years ago from the examination of rail steels made by acid and basic processes. My results showed that basic steels of the same carbon content when subjected to the same heat treatment, always gave a distinctly lower maximum stress and slightly higher elongation than acid steels, and this is generally true of the results given in the paper."

New High Resistance Electric Pyrometer

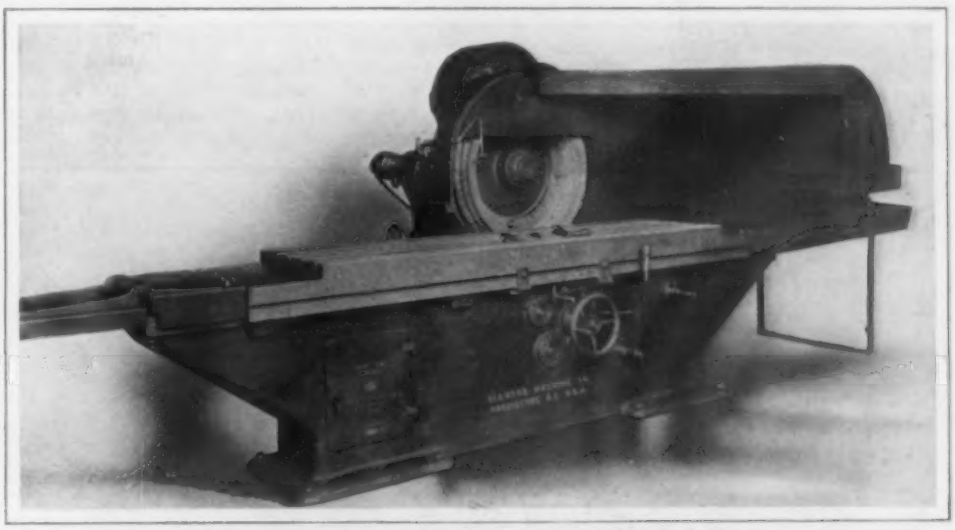
As a result of a series of exhaustive tests and experiments extending over a period of two years, the Brown Instrument Company, Philadelphia, has developed a new high resistance electric pyrometer of the pivoted type. In this device, the moving element or coil is not suspended from the end of a wire or metal strip, as is the case with the suspension type, but is supported by a small hardened steel pivot, resting in sapphire bearings. As a result it is explained it is not necessary to level the instrument carefully before using. The moving coil and pole pieces of the magnet have been designed to give a magnetic flux of great intensity. The moving element has also been lightened, which fact is calculated to give greater accuracy. The instrument is furnished in either the indicating or recording types, and for use with either base metal or platinum thermo-couples.

A Heavy-Duty Face-Grinding Machine

Increased Capacity and Protective Guards Among the Notable Features

As a logical development from its older, simpler and lighter types of grinding machines, the Diamond Machine Company, Providence, R. I., has placed on the market a heavy duty type. This machine is designed for heavy face grinding work and more especially for the finishing of railroad locomotive guide bars. In the development of the new machine, the capacity for work has been increased until now pieces which in former days would have been finished in the planing or milling machine are now being regularly handled.

Among the advantages claimed for the machine are not only speed in operation, but also in time gained in setting the work up, as it is held with simple straps or fixtures. Another advantage claimed for the grinding machine is that only one thrust has to be taken care of, that involved in holding the work against the grinding wheel, although this, in the case of heavy pieces, is absorbed to a large extent by the inertia of the work itself.



Front View of a Recently Developed Heavy-Duty Face-Grinding Machine

As may be seen from the engravings, the bed of the machine is of heavy construction, and additional stiffness is secured by internal ribs. A V-way in the front and a flat one in the rear, both of which are very broad, are finished by scraping to master plates, and have oil pockets and rollers. At one end of the bed, which is 134 in. long, a cupboard is provided. The same heavy ribbed construction also characterizes the column, which is firmly bolted to the bed. The wheel head ways are 6 in. wide and the wheel shroud is relied upon to protect them from emery dust. There are five T-slots for ¾-in. bolts planed from the solid portion of the table, which it is pointed out furnishes an easy and positive means for strapping work in place. For the removal of water, there are a number of runways cored in the table, the dimensions of which are sufficient to prevent clogging. The V construction, gibbed at the rear, in conjunction with the heavy weight of the table, which extends the full length of the bed, 134 in., and is 24 in. wide, is calculated to prevent any lift or give.

The weight of the wheel head is borne by broad ways on the column, while narrow inner ways are also used as additional means of preserving alignment. There is a taper gib for the ways and back lash is taken up by a spring. The top of the wheel head is planed to receive a motor for driving the spindle through a belt or set of gears. The 5-in. grinding wheel spindle is of 0.50 per cent. carbon steel, finished by grinding and lapped into its bearings, which are formed of half phosphor bronze bushings having liners to take care of the adjustment. Threaded collars provide a means for taking up end play, and the thrust is taken by a ball thrust bearing, working against hardened and ground tool steel collars, while the whole thrust arrangement is shrouded by a sleeve to prevent the entrance of dust.

Cast iron, which is turned all over, is used for the body of the wheel chuck. The body is tapered on the outside and is slotted, so that it may be compressed by a steel ring, which is drawn up on the taper by bolts, thus holding the wheel in position. A backing plate, which is adjusted by studs, brings the wheel forward as it wears away and gives an added support to the wheel against the thrust at all times. The chuck, which is bored to a 5-deg. taper, is fastened by a Woodruff key to the spindle, and is held in place by a 3½-in. steel nut. The operation of unscrewing this nut automatically draws the chuck off the spindle. Emphasis is laid upon the fact that this type of chuck holds a 30 x 6 in. wheel firmly and prevents it from working out of the chuck, even though it may be broken in a number of places, and also permits it to be used down to a minimum depth of 1¼ in. It is also possible to use a narrow wheel by this method of mounting.

A three-step cone pulley fastened by a square key to the rear end of the spindle transmits the power for the table feed to an intermediate shaft on the right side of the machine, through a 2-in. crossed belt. The drive from the intermediate shaft is back to the left side of the machine, through the column by 2-in. open and crossed belts to the table driving shaft. This shaft is rotated by two loose and one tight pulley in the center, the whole arrangement being similar to the drive of a planing machine. The feature of this drive, upon which such special emphasis is laid, is that the jaws do not carry the shift of the belt, but merely actuate the shift. A fourth loose pulley on the driving shaft is connected by friction to a cam. The tripping of the dogs releases the cam which is carried by the fourth pulley through the friction for a half revolution, and in turn pulls the lever, which shifts the belts by a typical planing machine cam. It is pointed out that with this arrangement the shifting is not felt by the table, and is also reduced to a minimum by the working belt sliding on the face of the loose pulley slightly before the idle belt begins to drive. This shift is also positive, which it is pointed out would not always be the case if the table, which has a relatively low rate of speed, was relied upon to operate the shift.

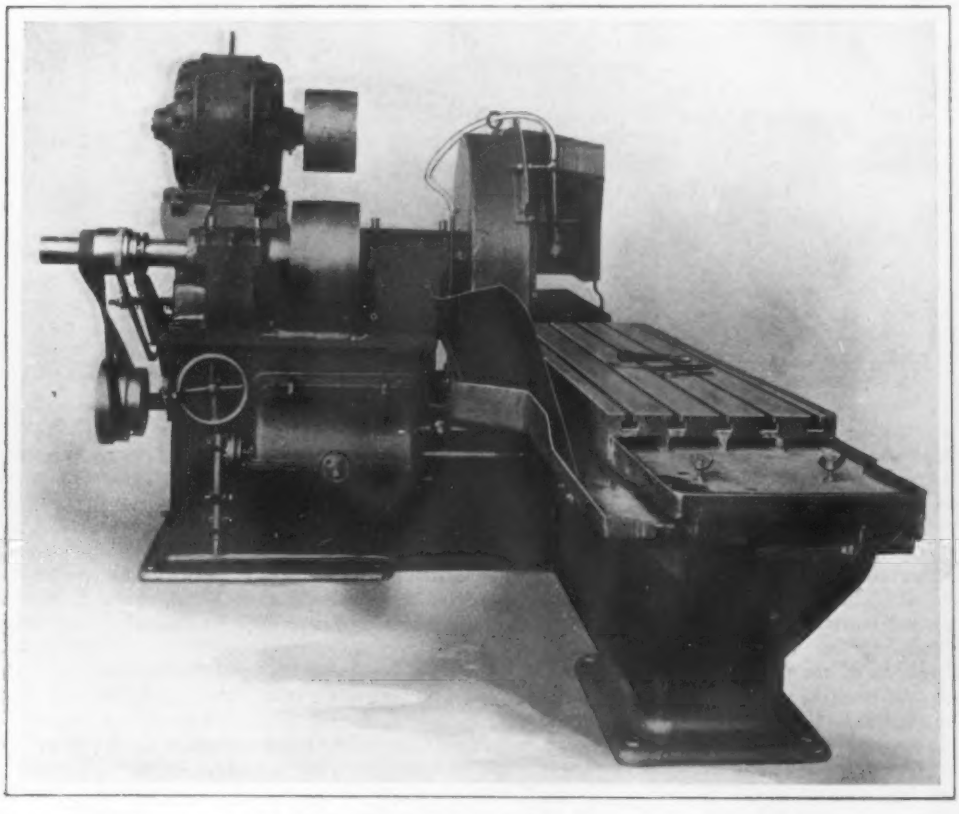
The direct table drive is through a four shaft reducing train, all the gears of which are of steel, with teeth cut from the solid. The face width of the bull gear is 2½ in., and it is practically impossible to strip it. The machine can be controlled from either the front or the rear, an arrangement which enables the operator to place the work from the front, adjust the dogs for travel and step to the rear of the machine while the grinding is taking place. From this position it is possible to view the work and stop the machine by operating the rear levers when the grinding is completed. The automatic feed, which ranges from 0.0005 to 1/16 in., is located at the rear of the machine only, since this is the normal position for the operator when this device is being used. If two machines are used, they are generally placed back to back, so that it is possible for one man to control both.

Oil rings dipping into reservoirs lubricate the spindle, while three oil rings are provided for the front and two for the rear bearings. The ways have grooves for oil travel and ample pockets in the bed with broad rollers are also used. The shafts are lubricated by spiral oil grooves leading from covered oil tubes, all of which are grouped as far as possible to facilitate oiling up.

A centrifugal pump driven from the spindle cone pulley and having a nozzle which is adjustable from ⅛ to 1¼ in. to give a variable flow throws water diagonally upon

the wheel, thus washing the grinding residue from the wheel face. The emery particles and stock removed by the rapid grinding when mixed with the water do not rise and fill the air, but are carried down to the settling tank and deposited beneath the water surface there. Large cored runways in the table and troughs under the edge lead the water and grindings to a 10-gal. settling tank, from which the clean water flows to the main tank, which has a capacity of 49 gal. Both of these tanks are separate from the machine, and are located on the right side. The use of separate tanks, it is pointed out, enables much larger ones to be used, and at the same time, the possibility of using heated water is done away with.

Special care has been taken in designing the machine to protect the various parts apt to cause injury to the operator by guards. Water guards are fastened to the ends of the table to protect the ways, while another is placed close to the hood and in front of the rear controlling devices to protect the operator from any possible splashing. The main water guard is located at the right of the machine and catches the water that is thrown off by the wheel, emptying the liquid into a water trough. A guard is also placed on the inside of the chuck, so that wrenches, etc., cannot slip into the chuck or the operator's hand be injured by the moving studs in the wheel backing plate. The special type of chuck construction used by which a broken wheel is retained in place does away with the necessity for any wheel guard. The machine is arranged for belt drive from an overhead countershaft, or for motor drive to the spindle through belts or gears, the motor being mounted on the top of the wheel head. For this purpose, any standard type of motor can be employed, and when the gear drive is specified a rawhide idler is used, and all of the gears are protected by a removable guard.



Side View of the Machine

Fuel dust from locomotives is utilized in the power station at Ostrowo, in Prussian Silesia, according to the Zeitung des Vereins Deutscher Eisenbahn Verwaltungen. The dust is that which passes through the tubes of locomotives and collects in the smoke boxes. It is placed in gas producers operated with suction gas engines. There are two gas engines, each of 180 hp., and current is generated at 5000 volts for transmission to railroad stations where the current is used for light and power purposes.

Recutting High-Speed-Steel Milling Cutters

After considerable experimental work the recutting of high-speed-steel milling cutters is being accomplished by the Peninsular Tool Salvage Company, Randolph street, Detroit, Mich. Recutting the teeth in old worn out milling cutters, it is claimed, is being done without annealing, warping, cracking, distorting the holes or drawing the temper. One secret of the success of the process appears to lie in affecting the radiation of the heat to such an extent that the temper is not destroyed. It is stated that not much difficulty is met in recutting cutters made of carbon steel, as these can be annealed, worked over and reharddened at a lower temperature than high-speed steel. In recutting high-speed-steel cutters, however, difficulty is met in annealing and the extreme temperature necessary to reharden is said to have made it unprofitable if not impossible to work over old high-speed-steel cutters by employing methods that would prove successful in the case of carbon steel. This is held especially true of plain milling cutters and slitting saws where the width of the face of the cutter has to be maintained. Under the new process employed the width of the face is reduced only on the side milling cutters. The original width is maintained on plain milling cutters and these are reduced only slightly in diameter. The hole in all types remains the same size and concentric with the periphery of the cutter.

In recutting, the tops and sides are first ground down as much as necessary to form new teeth, this being done on grinding machines of special type, and the teeth are then cleared to sharpen them by a method which is said to give a straight line clearness which insures a cutting edge that will stand up the same as when new. It is stated that the complete operation of recutting a 6 x ¾ x 1-in. high-speed side-milling cutter takes 38 min. The process is applied to plain and side-milling cutters 12 in. in diameter and 1½ in. in thickness and smaller, and to slitting and cut-off saws of any diameter and thickness. Spiral milling cutters are not recut, but plain milling cutters originally cut spiral are recut straight.

The Milwaukee Merchants' & Manufacturers' Association has succeeded in gaining a temporary suspension of the proposed increase in freight rates on scrap iron shipped via the Chicago, Milwaukee & St. Paul Railroad between Milwaukee and Chicago. The railroad intended to increase the rate from 50 to 70 cents per gross ton, effective September 10. The Interstate Commerce Commission has suspended the order until January 8, 1914, pending hearings. It is claimed that the proposed new rate is much higher than rates applied to manufactured iron and steel products.

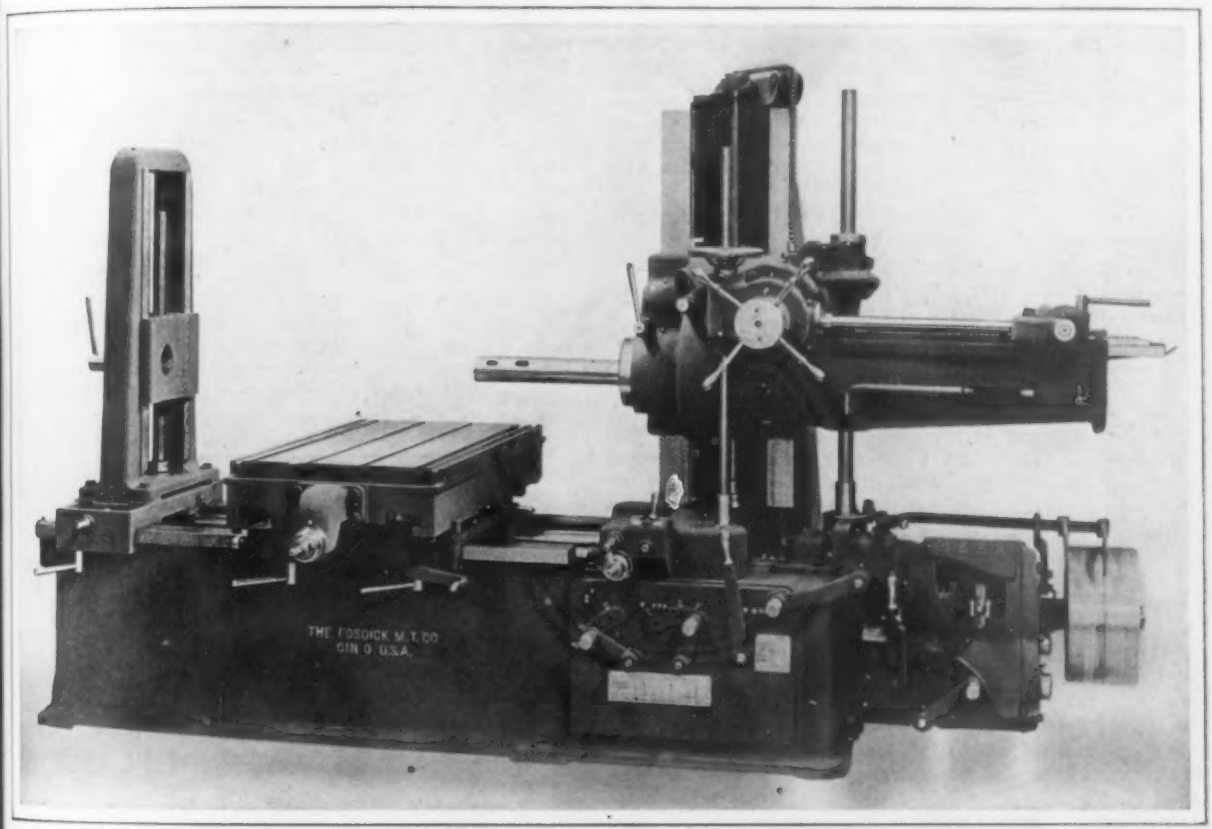
It is expected that early in November two of the new open-hearth furnaces of the Brier Hill Steel Company, Youngstown, Ohio, will be ready for operation. The steel plant will have seven 75-ton furnaces and will roll billets and sheet bars, most of the latter product to be used in the company's sheet mills.

Horizontal Boring, Milling and Drilling Machine

A number of improvements are found in the new No. 0 combination, horizontal boring, milling and drilling machine, which has recently been brought out by the Fosdick Machine Tool Company, Cincinnati, Ohio. Among these may be mentioned centralized control, narrow gibbing surfaces, steel gearing cut with special cutters, the use of self-oiling bearings and phosphor bronze bushings, the thorough incasing of all moving parts and the employment of precision micrometer dials which can be set to zero in any position.

The bed is deep and reinforced by ribbing, thus making the machine self-contained and rendering a foundation unnecessary. Chips and dirt are carried to the rear of the machine by special chutes. The column, which is of heavy box construction, has an extra wide face.

The head, which has a vertical adjustment of 25½ in. on the column, and the outer support are raised and lowered simultaneously by rapid power traverse, by hand or by the feeds. The elevating screw is suspended from a ball bearing at the top to avoid buckling, and there is a steel cable chain to connect it to the counterbalance. Automatic safety trips are provided to stop the head at either extreme of its travel.



The New Fosdick No. O Horizontal Combination Boring, Drilling and Milling Machine

The spindle, which is 3⅛ in. in diameter, is made of crucible steel, and is fitted with a No. 5 Morse taper and a cotter keyway. Two long driving keys drive the spindle, which slides in a sleeve having a tapered phosphor bronze bushing to take up the wear, the thrust being taken on a ball bearing. The quick advance and return turnstile is conveniently located at the front of the head, and emphasis is laid upon the fact that by a device in the sleeve, the spindle may be held in perfect alignment after any amount of wear. The spindle has a traverse of 26 in., and the distance between the base of the spindle and the boring bar support is 5 in. There are 16 spindle speeds available, the range being from 12 to 225 r.p.m.

The table, which has a surface of 24 x 50 in., is of heavy construction with planed T slots. The cross travel of the table is 30 in., while the longitudinal traverse is 2 in. more, with automatic safety trips at the limits of both movements. An oil channel runs all around the table.

The feed is inclosed, and all the gears are of the steel slip type. Two handles in front of the machine render any one of the 18 feed changes available without stopping the machine. The rates of feed, which range from 0.004 to 0.396 in. are given on a metal plate, and are the same for the spindle, table, saddle or head, in any direction. As the selection is made by a single handle, it is pointed out that it is impossible to get any but the desired movement. The direction of the feed is reversed with the reversing of the spindle, and when the spindle stops the feed does also. An independent feed reverse lever is provided, and there is a safety friction device which is adjustable from the outside to prevent accidents. All the parts having feed have power rapid traverse, which is always in the opposite direction to the feed.

The drive of the machine is direct, no countershaft being required, and there is a direct reading index over the speed changing handle, which gives the number of revolutions per minute of the spindle. An overtake clutch keeps the machine running at a reduced speed, while the changes are being made, an arrangement which it is pointed out eliminates shocks. The reverse mechanism is embodied in the construction and is operated by a lever in front of the machine. Latches are provided to secure the levers when heavy work is being handled and thus prevent chatter. Although not designed for motor drive, this can be added at any time. A 5-hp. constant-speed motor operating at from 1200 to 1400 r.p.m. is employed.

The National Society for the Promotion of Industrial Education will hold its seventh annual convention in Grand Rapids, Mich., in the week beginning October 19, and there is also scheduled for the same week, in connection with the society, an organization meeting of the National Vocational Guidance Association. A tentative program for the convention has been issued by C. A. Prosser, secretary of the society, 105 East Twenty-second street, New York City. Among the addresses announced are: "What Vocational Education and Vocational Guidance Mean to the Future of the Country," by William C. Redfield, Secretary of Commerce and president of the society, and "The Psychology of Vocational Guidance," by Dr. Leonard P. Ayres, director Educational Department, Russell Sage Foundation, New York City.

A System of Burning Producer Gas

The Combustion of Gases and the Replacement of Fuel Oil, with Special Reference to the Combustion of Lean Gases

BY C. M. GARLAND*

Through the study of regulation and control of combustion in furnace work, the writer has developed a system for the combustion of gases, which insures high furnace efficiency when used for the combustion of the richer gases and makes possible the use of the leaner gases for high temperature work with resulting high furnace efficiency. Professor Bone's "Surface Combustion" [*The Iron Age*, December 7, 1911] has emphasized, if emphasis were needed, the importance of intimate mixtures of gas and air, and the limiting of the air supply to the amount demanded by theory. His porous or granular surface insured the former, which made the latter possible. It has been the purpose of the writer's study to develop a burner that would accomplish these results, and, in addition, to combine this with a system of distribution which would place the combustion under positive control and make regulation independent of operators.

In the combustion of gaseous and other fuels for maximum economy in the transmission of heat, four well-recognized conditions must be maintained, which are summarized in the following manner:

a, There must be sufficient air to supply the quantity of oxygen necessary for complete combustion.

b, The air must be intimately mixed with the fuel so that each combustible element of the gas meets the requisite number of elements of oxygen.

c, The mixture of air with the fuel must occur in a minimum of time, and also in a minimum space in order that the conduction and radiation losses, which are a function of the time, may be reduced to a minimum.

d, The amount of air supplied should approach that necessary to supply the theoretical quantity of oxygen necessary for complete combustion. The excess of air above the theoretical amount required results in the lowering of the maximum temperature, consequently the efficiency of heat transmission.

Since the conditions of maximum economy, therefore, require the development of maximum temperature, the conditions above outlined must be fulfilled in the production of the maximum temperature. This is of paramount importance in the combustion of the leaner gases; that is, producer gas and mixed gas from the water-gas process. In the combustion of the richer gases, natural gas, illuminating gas or coke oven gas, the obtaining of high temperatures; that is, temperatures between 2400 and 3000 deg. F., which are the temperatures required in the large proportion of furnace work, is accomplished without difficulty, as it is by no means necessary to fulfill the conditions enumerated for maximum economy. For the leaner gases, however, the conditions for maximum economy must obtain in order to secure the production of maximum temperature, and the maximum temperatures obtainable with these gases are between the temperatures of 2200 and 3000 deg. F.

This therefore, explains why the obtaining of suitable temperatures for the high temperature work from the leaner gases has not been entirely successful. It should be remembered, however, in this connection that the occasion for the use of the leaner gases has not existed until within the last year, and that this occasion has arisen due to sudden fluctuations in the price of fuel oil. When the price of this oil varied from 2 to 3 cents per gallon, no cheaper fuel could be found. When the price, however, jumped from 2 cents to 5 and 6 cents per gallon, and when again contracts for large supplies could not be made in advance, the demand for a cheaper and more stable fuel to replace the oil became imperative.

Of the fuels available for the replacement of fuel oil in the present state of the art, producer gas generated in producers (as opposed to the air gas generated in water-gas sets erroneously termed producer gas), is the cheapest, with mixed gas from water-gas sets running a close second. The richer gases, such as water-gas where the air gas cannot be utilized, illuminating gas and coke-oven gas, are, under most conditions, either prohibitive on account of price or are not available. In the use of producer gas or mixed gas from water-gas sets for the production of high temperatures in the smaller furnaces, such as are used for forge work, for heat treatment and for glory holes in glass blowing, where high temperatures are essential, and therefore high economy, since the two are interdependent, it is essential that the four conditions outlined above be maintained.

For the purpose of making the leaner gases available for this kind of work and for increasing the economy in the use of the gases of higher heating value, the writer has designed a system of burners and regulators for the distribution and combustion of gases that places the combustion under positive control and assures that the conditions for maximum economy are always maintained. The burners are so designed that when operating in connection with the pressure regulators the mixture of gas and air remains constant for any given discharge of gas and air within the capacity of the burner. The regulation of this mixture is also made positive and entirely independent of

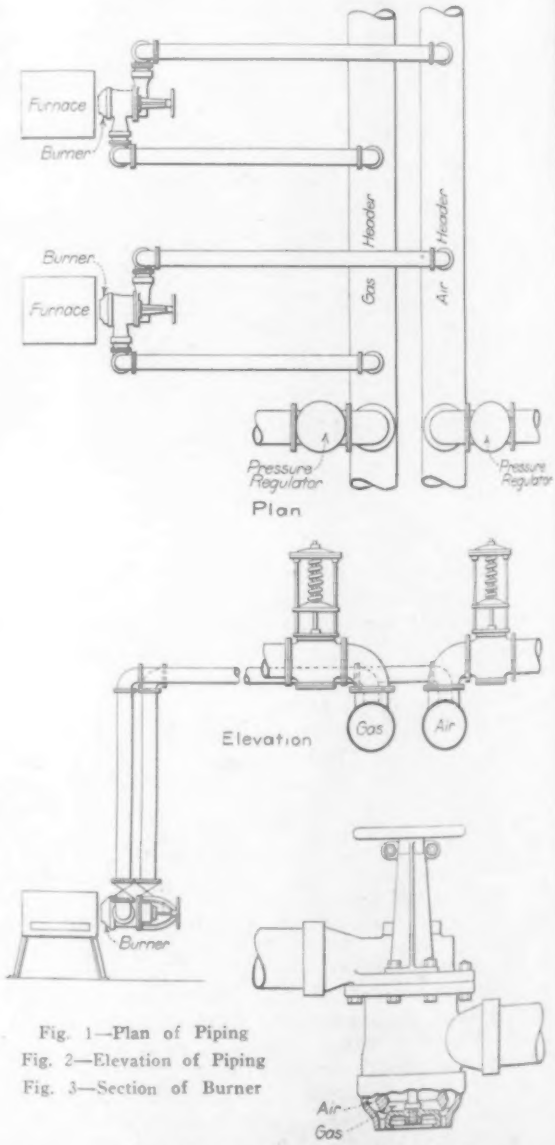


Fig. 1—Plan of Piping
Fig. 2—Elevation of Piping
Fig. 3—Section of Burner

The Gas Burner and the Piping System

*Combustion engineer, Woodmansee, Davidson & Sessions, Inc., Chicago.

the operator, so that conditions cannot be changed. The valves are designed so that the gas and air are divided up into two hollow cones formed of thin walls, which intersect near the burner under high velocities, thereby producing almost instantaneous mixture of gas with air. The combustion is, therefore, accomplished with practically the theoretical quantity of air required, and this combustion is so complete that only a trace of carbon monoxide can be found in the products of combustion. This system, therefore, eliminates one of the most serious drawbacks in the use of gas in open furnaces, especially gases with a high carbon monoxide content, where the failure to supply sufficient air for combustion results in carbon monoxide being discharged into the atmosphere of the room, which invariably affects the workmen in a most disastrous manner. Since the combustion occurs with the theoretical quantity of air necessary, the temperatures are the maximum obtainable, and the efficiency is also the maximum obtainable for the given furnace under the existing conditions.

For the prevention of accidents, due to explosions in the mains, the burners have been designed to prevent the leakage of gas from the gas passage into the air passage, and hence into the air line, or the reverse.

The system is illustrated in Figs. 1 and 2, and a section of the burner is shown in Fig. 3. Referring to Figs. 1 and 2, it will be noted that the system consists of an air header and a gas header which are supplied through the connections with air and gas respectively, under pressure. These are delivered through the pressure regulators shown and maintained at a constant pressure in the headers. This pressure is consequently somewhat lower than in the supply connections. The tributaries supplying each furnace are designed so that the pressure drop in each is the same. Stop valves are provided in each tributary for permanently cutting off the gas from the burner, as this latter is used primarily for proportioning and mixing the gas and air.

Some of the results obtained from experiments in the development of this system of combustion are shown in the table. These results were obtained in a furnace of rectangular section as commonly used in forge work. Referring to the table, it will be seen that the results of three tests are given. The analysis of the gas supplied and the exhaust gases are given for tests Nos. 1 and 2, while the analysis of the gas supplied is given for test No. 3. The temperatures developed; the theoretical temperatures that should have been developed; the percentage of excess air in the exhaust, and the percentage of combustibles by volume in the gas are also given. It will be noted from Fig. 4 that the temperatures obtained are proportional, within the range of the tests, to the percentage by volume of combustibles contained in the gas. It will also be seen that the excess of air in test No. 1 is approximately 14 per cent. with 0.01 per cent. of carbon monoxide in the exhaust. In test No. 2 the excess air is only 0.8 per cent. with 0.2 per cent. carbon monoxide in the exhaust. The maximum temperature developed is 2640 deg. F., in the case of test No. 3, where the gas averages 133 B.t.u. per cubic foot. The temperatures were obtained by means of a platinum-rhodium thermo-couple, which had been previously calibrated.

The most interesting developments from the experiments is the fact that the gas has been burned with essentially the theoretical quantity of air necessary for complete combustion, and with only 0.2 per cent. of carbon monoxide found in the exhaust products. These results are indeed identical with the results obtained by Professor Bone in his surface combustion work, who also reports combustion of gases with essentially the theoretical quantity of air, and the obtaining of temperatures up to 1500 deg. C., or 2730 deg. F., when using Mond gas. The analysis of the Mond gas is not at hand, but we would expect this gas to average at least 140 B.t.u. per cubic foot. In the present experiment the temperature of 2640 deg. was obtained with a gas averaging 133 B.t.u. per cubic foot.

The theoretical temperatures for the mixtures as obtained on the test have been computed and placed in the table. The mean specific heats in the computation was taken as 0.3. The specific heat as computed from the formulas of Mallard & L'Chatelier were approximately 0.39. These formulas, however, have been recognized as giving results which are high. Since the exhaust gases

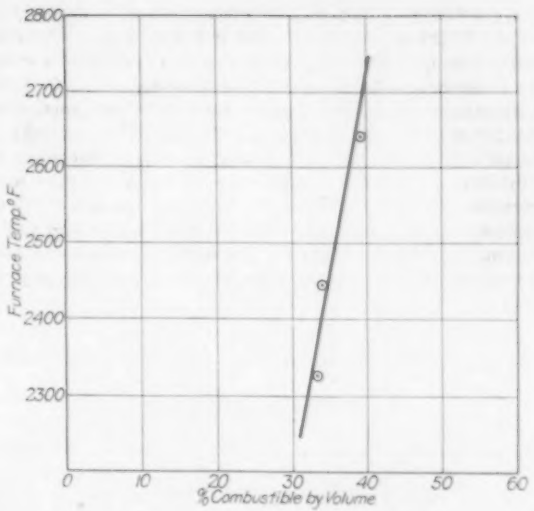


Fig. 4—Proportionality Shown between the Temperature and the Combustible Supplied to the Burner

are composed of carbon dioxide, the vapor of water and nitrogen in the proportions of 53, 8 and 140 respectively, we have assumed that the specific heat of nitrogen at constant pressure is constant between the temperature of 32 deg. and 2500 deg. We have further assumed that the specific heats at constant pressure of the gases, carbon dioxide and water vapor increases with the temperature according to the formulas of Mallard & L'Chatelier. Experimental determination of the specific heats of steam have borne out this assumption. On this basis the value of the specific heats of 0.3 was obtained. This value agrees well with the value for the specific heat at constant pressure, as obtained from the recommendations of Zeuner.

From the temperatures so obtained, it will be noted that the actual temperature in test No. 1 is within 70 deg. of the theoretical temperature that should be obtained from such a mixture. In test No. 2 the actual temperature is within 300 deg. of the theoretical temperature, and in test No. 3 the actual temperature is within 260 deg. of the theoretical temperature. These results, therefore, are results that could well be anticipated, as the only cause for the failure to develop the theoretical temperature is the loss through radiation and conduction and errors in experiment.

From the results it will be seen that the practical application of this system of combustion makes it possible to utilize the leaner gases for the replacement of fuel oil in such applications as forge work; the heat treatment of steel; the melting of brass; the burning of tile, brick, etc., and the fusion of glass in glory holes. The gas, when so used, competes with fuel oil at about 3 cents per gallon under average conditions; that is, when 14,000 B.t.u. coal can be delivered at $3 per ton, and the operation is 24 hr. per day. When the operation is only 10 hr. per day, the gas competes with fuel oil at approximately 3½ cents per gallon. The above costs include interest, depreciation, taxes and insurance.

Results of Tests with the Gas Combustion System

Analyses of Gas and Exhaust:	Test No. 1	Test No. 2	Test No. 3
Carbon dioxide, gas	8.2	6.8	4.6
Carbon dioxide, exhaust	18.0	18.6	..
Oxygen, gas	0.0	0.2	0.2
Oxygen, exhaust	1.8	0.1	..
Carbon monoxide, gas	23.0	23.8	27.2
Carbon monoxide, exhaust	0.01	0.2	..
Hydrogen, gas	9.7	9.87	10.9
Hydrogen, exhaust	0.0	0.0	..
Marsh gas, gas	0.8	1.3	1.0
Marsh gas, exhaust	0.0	0.0	..
B.t.u., high value	113.2	121.4	133
Temperature of furnace, deg. F.	2330	2440	2640
Temperature, theoretical, deg. F.	2400	2740	2900
Combustible in gas, per cent	33.5	34.9	39.1
Excess air, per cent	14	39.1	..

Where this system is used for the combustion of natural gas, the economy is increased anywhere from 5 per cent. to 50 per cent., depending upon the nature of the work and the burners previously used in the combustion of the gas.

In most instances the economy in the use of natural gas is exceptionally poor, due to the fact that where this gas is available it has been comparatively cheap and little effort has been used to obtain high economy. The present system, under average conditions, pays for itself in less than one

year's time where used for furnace work. Where used in firing of steam boilers with natural gas or any of the other richer gases, the efficiencies that may be expected are indeed much above results ordinarily obtained. In fact boiler efficiencies up to 90 per cent. are to be anticipated while capacities will be increased 100 per cent. Such results are entirely due to the small quantity of air required in the combustion. Where producer gas is used under boilers, efficiencies up to 85 per cent. may be expected. Higher economies are not possible with the use of this gas, due to the maximum temperature of combustion, which is doubtless something under 3000 deg. with a gas averaging 140 B.t.u. per cubic foot.

Correspondence

Heat Treatment for Steel Rails

To the Editor: In *The Iron Age* of September 11 is an article on the "Failure of an Open-Hearth Steel Rail" by James E. Howard; and another one appears on the "Crystallization of Steel Through Fatigue," by F. Rogers —a synopsis of a paper read before the Iron and Steel Institute at Brussels September 1. I would like to say something about the first one, and use the last one to lend force, if possible, to my remarks on the rail question. In passing, let me say that the paper by Mr. Rogers is a valuable one because of the comparative tests he gives, and for the reason that it was delivered before a body of influential men and so will help to get out of men's minds the mistaken view that steel crystallizes in use. When this error is out of the way we shall see more clearly the real importance of heat treatment for steel. Many years ago I tried to make clear to others what, from a study of fundamentals, I was certain of, namely, that steel does not crystallize in use. This I repeated in *The Iron Age* of November 25, 1909, p. 1634.

I have long been an advocate of treating rails as well as steel generally, and in the article just mentioned I called attention to tests I made on rail steel. A man would be guilty to-day if he sent out a high-speed automobile having its important parts consisting of steel in its common condition. Lately I visited two automobile makers' forges and I found about as much room given to furnaces for treating the forgings as for making them. And I say, without any fear of contradiction from practical demonstration, that it is wrong as well as uneconomical to use rails without treating them.

This does not by any means lead me to underrate the importance of care in making the steel, in inspecting the ingots, regulating the heats at which they are rolled, and in inspecting the finished rails. It somehow seems that because rails are such a heavy product, the mills, the railroads and the passengers give them much less attention than they deserve. Mr. Howard, than whom perhaps there is no higher authority, says in the article referred to above: "Such a dearth of important information as pertains to service stresses in steel rails is probably without a parallel in the history of the materials of construction." I say, as I have said about other forms of steel, there is no more sense in expecting an axe or a chisel to do its full duty without heat and cooling treatment than there is in expecting a rail to do so.

Of course, there are difficulties to be encountered in treating rails, just as in anything else worth doing; but whenever its importance is seen it will be done. But just as in the case of "steel crystallization," the metallurgical world will see sooner or later that treating rails is a necessity and, what is more, the real value of treating steel will be appreciated. For instance, it can be shown that while steel can usually be made twice as strong, measured in the usual way, by treatment, it can be made many times as able to withstand shocks. This is a fact that can be shown in an hour. In a line of experiments that I made it was clearly demonstrated that treated open-hearth steel of 1 per cent. carbon was much less liable to break than was the same kind of steel having only 0.5 per cent. carbon, untreated. In addition to this, the 1 per cent. carbon steel had the greater strength, owing to its greater carbon content, and this was in turn added to by the treatment. So a treated rail of 0.6 per cent. carbon will be safer than a 0.3 per cent. carbon rail untreated, to say nothing of strength and wearing qualities.

Mr. Howard says the Interstate Commerce Commission is "discussing the advisability of calling a conference of representatives of railroads and steel makers . . . . to discuss the whole situation." While they are trying to find the causes of failures I would respectfully suggest that they consider the question of the treated rail.

JAMES H. BAKER.

CLEVELAND, OHIO, September 18, 1913.

The Danger of Currency Expansion

To the Editor: Although Greenbackism is dead (and its offspring, free silver coinage), yet that its soul is stoutly marching on is proved by recent developments. The Glass-Owen currency bill is fundamentally an inflation measure and is frankly avowed as such. It is true that it also aims ultimately to replace the present system of bank notes secured by Government bonds by a system of notes secured by commercial paper; but this change is permitted to be 20 years in the future, and that but little interest is taken in this part of the scheme is evidenced by the fact that no provision is being made at the present time for the making of this change from a basis of Government bonds to one of commercial paper. But even in this minor aim of the new bill the guiding motive is obviously inflation.

Currency Increase and Volume of Business

The present national banking system is deemed unsatisfactory because it takes the currency out of the reach of the intermeddling fingers of a paternalistic Government, thus making inflation impossible; and the advantage in the proposed system of a commercial paper security for notes issued by an intrepid Government instead of by timid and cautious capitalists, who understand their business, is that it permits inflation to go on gaily until the last man who needs a dollar in his business is satisfied. This, it must be conceded, is a tremendous advantage from the viewpoint of the old greenbacker or free silverite, or of the modern inflationist brought into being by the exigencies of 1907. But the idea is one that is based on a miserable delusion, the delusion that an increase in the volume of currency causes additional wheels of industry to be put in motion. Alas! the wheels are all in the inflationist's head, the real truth being that the volume of currency has absolutely nothing whatever to do with the volume of business, or with tightness of money, either periodical or unusual, and that its sole effect is a change in the prices of commodities. Is a certain proportion of enterprises denied loans under a small volume of currency? Precisely the same proportion would be denied under a large volume with the same business caution in both cases. And the only "advantage" of the proposed currency scheme is that there would not be and could not be the same business caution and loans denied now would be granted then, with the result that capital if timid now would be more timid then. For such loans would intensify the conditions responsible for capital's timidity.

Not More Currency but Confidence Needed

It is quite true that the clearing house certificates of 1907 were a good thing, but Government notes loaned instead would not be a good thing, partly because they would be amateurish instead of expert, but more especially because of the fact just stated that the continued thwarting from the start of nature's desperate efforts to get back to healthy business conditions, through a temporary cessation of industrial activity, would simply prolong the agony and make less effective such palliative measures as the clearing house certificates or Government notes at the hight of the disease. Not lack of currency but lack of confidence is the real and fatal feature of industrial depressions and credit contraction; and with capital timid and distrustful we may go on in Government loaning and inflation of the currency until the crack of doom without accomplishing anything—except that the more we inflate the more alarming conditions will get. It is vacuously assumed that capital's timidity at such time is baseless. What nonsense! The capitalist is no fool, and the pinch he feels cannot, therefore, be an imaginary one. What

really is imaginary is the insufficiency of currency that is worrying the well-meaning and simple-minded Government, and the dark ages may perhaps be searched in vain for a more foolish exhibition than that it is now bent on making of itself.

The Cause of Present Financial Conditions

The currency is infinitely elastic and the cause of the 1907 money stringency or of the present one is not a "volume of currency insufficient for the demands of business," but a timidity of capital not to be allayed or lessened but increased by currency inflation, and that would have been in evidence with any currency volume. The cause of the timidity in 1907 was a realization of the fact of overproduction of the means of production, and the Glass-Owen bill, had it been a law at that time, would have increased the overproduction and thus have intensified and prolonged the subsequent panic. The cause of the present timidity—now happily disappearing apparently—is quite a different and far more serious thing. *The Iron Age* in a valuable editorial of June 26 has brought out the fact that in the iron trade at least there is no overcapacity at the present time. The fact is that the high cost of production has eaten up profits and is starving capital in the midst of plenty of business. There are exceptions, as the Steel Corporation's last report shows, but special reasons, perhaps, for these exceptions. In the main the capitalist is drifting to a point where, like a shipwrecked mariner with regard to water, he will see business, business everywhere and not a dollar for profits. As remedies for these conditions, tariff reform, trust busting, rate fixing, political control and currency inflation on the part of the Government, and inventions in machinery, improvements in processes and scientific management on the part of the individual—all these are perfectly futile. Most of the Government proposals are far worse. The only real cure must be found in a study of the cause of the high cost of production, which study once started will be found very simple and easy.

Wall Street and Kansas in Unison

To return to the currency: We were not surprised at the old Populists; but what has led Wall Street, usually so astute, astray in these modern times? In the limelight of the proposed bill we behold the astonishing spectacle of Wall Street and Kansas lying down amicably together. Wall Street may unreasonably protest against having the profits on one-fifth its capital limited to 5 per cent. and may have foolish and frivolous objections to this part of its business being managed by others not in the business and not understanding the business; it may severely criticize various other details of the proposed bill. Yet with the main purpose—currency inflation—Wall Street is in hearty harmony and differs from Kansas merely in that it wants inflation only in times of stringency, while Kansas wants it all the time. Not a fundamental difference, it would seem.

The writer believes that what has put Wall Street on the wrong track here is the phenomenon of the periodical high rates for money at crop moving times. For in this phenomenon would seem irrefutable proof that the currency is not elastic; that it does not stretch, through the operation of a fall in prices, to meet all business demands, and that, therefore, there can be an insufficiency of money on occasion.

Yet he believes also that reflection will show that these high rates are not really and fundamentally the result of scarcity of money, but that they constitute merely a premium, a bonus, an extra compensation to capital for the performance of an extraordinary service. The reserving or the withdrawal (or both) of a large amount of money from investment or speculation at certain regularly recurring periods cannot be accomplished without a certain amount of loss and inconvenience, which, of course, the borrower must stand. In brief, this high money rate is in the main a business profit, and a necessary and legitimate one under any volume of currency, however great.

It is like the price of a cup of coffee. If we want somebody to stand ready to supply a cup of coffee when we happen to want it, we must pay him for it. Now, suppose a motherly Secretary of the Treasury should loan large sums of money for little or no interest to certain restaurateurs with the hope, amiably expressed, that it would lower the price of a cup of coffee to the hungry and thirsty. The result would probably be that the pleased and appreciative restaurateurs would use it in their business, or perhaps (horrid suspicion!) speculate in stocks with it, and the price of a cup of coffee would remain the same as before, or possibly be shaded just enough to encourage the confiding Government to further random contributions, with the loss made good elsewhere besides.

Loans to Farmers

So Secretary McAdoo has not done anything—except possibly the first time, with business taken unawares—for the farmers and other borrowers. He has simply given the bankers more business, business which he has a perfect right to give and they to receive; but to imagine it a boon to the borrowers is a wild flight. His performance is a perfectly proper one, but not one calling for unbridled exultation or extravagant delight. And to loan directly to the farmers, etc., at low rates would not be a proper performance, although in this case successful in its object. For the money of the whole people may not rightfully be loaned to a part of the people at bargain rates. Full rates must be obtained obviously.

In conclusion: The present is a particularly inopportune time for currency inflation on account of the tariff bill. To lower the tariff, and at the same time enact a law which will tend to raise prices, thus causing commodities to flow in and gold to flow out, would seem to be a singularly stupid performance even for Washington. If the proposed currency bill were a contraction measure the war cry, "Tariff reform and currency reform must go hand in hand," would be more appropriate and inspiriting.

GEORGE AUCHY.

TACONY, PHILADELPHIA, September 10, 1913.

Wrought Iron's Position Assured

To the Editor: There is no real fight between iron and steel. They have both been in use since the dawn of civilization. Much progress has been made in both processes, but it is fair to state that the evolution in steel has been more notable than that of iron. Still, with all the improvements that have marked the history of steel there yet remain points to trouble the steel manufacturer. For instance, I have in writing from a practical chemist and metallurgist the following:

> In regard to segregation, this occurs in every steel ingot that is cast, and is caused by the center cooling more slowly than the outside, and the impurities gather at the point last cooled. The chemist has nothing whatever to do with this phenomenon and the sample which we take in the converting works represents the heat of steel in a molten condition. It also represents the average of all the steel in the ingots from each heat.

The above was used in a case where complaint was made of "piped center" in steel used by a forging company. "Impurities," according to the above, are admitted by the experts and prevent a perfect assimilation, so that in case of a bad "piped center" it seems fair to say the ingot falls short of absolute and perfect homogeneity, which is claimed as the leading characteristic of steel by the melting process.

Another enemy that steel has to contend with is corrosion. Much has been said on this point and the evidence seems to be heavily in favor of iron as a rust resister. A company claiming to make a grade of iron by the ingot process asserts that: "About nine years ago the United States Department of Agriculture received so many complaints about the rapid rusting and short life of steel wire that an investigation by the Government was considered necessary. The result of this investigation pointed out that the impurities in steel, chiefly the manganese, were the cause of its short life and rapid rusting." It is a fine compliment to iron to note that many of the latest skyscrapers have used wrought-iron pipe throughout in preference to steel, on account of the greater immunity from corrosion in iron.

Wrought iron has come by long custom to divide up into the following classifications: Standard common, refined, double refined, engine bolt, regular staybolt, and double X staybolt. The highest grades are made exclusively from puddled pig iron, selected on analysis, worked through all processes with expert care, and guaranteed up to the rigid requirements of the most exacting specifica-

tions. These ample divisions cover the iron field, and discriminating buyers select, or should select, the grade best suited for their work and recognize the extra cost in material and labor to produce the extra grades over standard common iron.

To show the quality of the best grades of iron, the following tests on different brands were made by an engineer chosen by a railroad company having no interest in any iron plant and making its own selections from five different makes of high grade irons:

No.	Diameter	T. S. per sq. in.	Elastic limit, sq. in.	Per cent. elong. in 8 in.	Per cent. red. in area	Vibratory	Fracture
1	1.012	50,700	36,490	30	48	5205	Fib. ½ cup
2	1.012	49,820	35,640	30	47	7305	Fib. ½ cup
3	1.007	49,320	35,220	30	49	6910	Fib. ½ cup
4	.997	45,500	31,170	32	54	3530	Fib. ½ cup
5	1.001	45,550	31,930	29	54	1235	Irregular
6	1.002	47,050	31,740	27	47	5304	Fib. ½ cup

NOTE.—Vibratory test was conducted as follows: Free or vibratory length, 6 in.; tension vibrating end, 2700 lb.; rate of vibration, 100 r.p.m.; amount of vibration, ⅛ in. radius. Threaded bars standard staybolt thread. All bolts secured in vibratory machine by 90 lb. pull on 48-in. wrench. Spring balance used to calibrate pull.

Iron men justly lay great stress on the fibrous nature of iron, its removal from tendencies to crystallization, its great ability to resist shocks and strains of every nature, its ductility and superior welding properties, and its acknowledged leadership as a corrosion and rust resister.

There is no fight on these claims. They have been demonstrated for decades by actual experience and now by searching and truth-revealing testing machines. It is a compliment to iron to see efforts made by some steel men to gain the properties that have always belonged to iron. These inherent rights of iron are destined to remain in iron and not to be wrested from it by dopes in the present steel process.

Steel is a grand world benefactor and a tonnage record breaker. It has won its place and will keep it and probably will yet achieve a larger field through further developments and perfections, but, while its present structure remains, so will its limitations. Iron has held its field since the first dawn of metallurgy. It is the oldest of all the metals and dates back a thousand years B. C. In all that time it has withstood the notable advance of its rivals and to-day holds its own special field with confident grip, on account of its merits and intrinsic worth.

M. B. P.

American Standard of Flanges and Flange Fittings

The question of standardizing flange fittings and flanges, for both standard and extra heavy pressures, has reached another stage. The manufacturers' committee on standardization of fittings and valves has adopted a new standard, known as the American standard, dated September 17, 1913, and effective January 1, 1914. The present standard appears to be a compromise between the so-called manufacturers' standard of last year and the 1912 United States standard, the latter drawn up by a committee of the American Society of Mechanical Engineers. Owing to the undesirability of having two standards in existence, the committee of the American Society of Mechanical Engineers and the committee of the manufacturers have again been considering the various phases of the subject, including the strength of the fittings, the strength of the bolts, as well as commercial features, and the compromise means that bolting was increased where thought necessary, and additional size flanges have been added and center to face and face to face dimensions have been altered to conform to the requirements. The committee of manufacturers, W. H. Douglas, secretary, 30 Church Street, New York City, has issued a 16-page pamphlet on the standard, containing illustrations and tables of dimensions.

A vocational training department for boys between 14 and 16 years of age has been established in the Milwaukee School of Trades for Boys, a municipal institution for which the city of Milwaukee has recently constructed a $250,000 building. The course will include seven hours of practical work in the shop and three and one-half hours of class work.

Mining Engineers' October Meeting

The fall meeting of the American Institute of Mining Engineers, which is to be under the auspices of its Iron and Steel Committee, will be held on October 16 and 17, 1913, in the United Engineering Societies Building, New York City. Invitations have been sent out to the members of the following societies, through the respective secretaries, to attend this meeting and the dinner, which will be given on the evening of October 17: American Society for Testing Materials, American Iron and Steel Institute, American Society of Mechanical Engineers, American Society of Civil Engineers, American Institute of Electrical Engineers, American Foundrymen's Association.

Members of these societies have also been invited to contribute to the discussion of the various papers to be presented at the meeting, a revised list of which appears in the provisional programme given below. Many individuals of national and international prominence have also been invited to contribute discussions to these papers, and the response to these invitations has been extremely encouraging.

First Session, October 16, 1913, 10 *A. M.*

W. A. Forbes, "Blast Furnace Gas Cleaning."
W. H. Blauvelt, "The Slagging Producer."
Prof. F. Peter (Leoben, Austria), "The Generation of Steam by Waste Heat from Furnaces."
G. C. Stone, "The Generation of Steam by Waste Heat from Regenerative Furnaces."
W. R. Shimer, "Over-Oxidation of Steel."

Second Session, October 16, 2 *P. M.*

H. F. Miller, Jr., "New Design of Regenerators for Open-Hearth Furnaces."
Dr. Richard K. Meade, "The Use of Powdered Coal as Fuel."
H. R. Barnhurst, "The Use of Powdered Coal as Fuel for Metallurgical Furnaces."
W. S. Quigley, "The Use of Powdered Coal as Fuel."
E. Stuetz, "The Scoria Process for the Manufacture of Fine-Ore Briquettes."
Felix A. Vogel, "Briquetting" and "Use and Advantages of Briquettes in Blast Furnace Practice."
R. H. Lee, "The Use of Nodulized Ore in the Blast Furnace."

Third Session, October 17, 10 *A. M.*

H. M. Howe, "Discussion of the Existing Data as to the Position of Ae_3."
H. M Howe and A. G. Levy, "Determination of the Position of Ae_3 in Carbon-Iron Alloys."
H. M. Howe, "Ae_1, the Equilibrium Temperature for A_1 in Carbon Steel."
G. K. Burgess, J. J. Crowe and H. S. Rawdon, "Thermal and Microscopical Examination of Professor Howe's Standard Commercial Steels."
H. M. Howe, "The Divorcing of the Eutectoid in Meteorites."

Fourth Session, October 17, 2 *P. M.*

R. R. Abbott, "The Influence of Various Elements on the Absorption of Carbon by Steel."
J. V. Emmons, "Some Phase of the Practical Treatment of Tool Steel."
W. E. Ruder, "Grain Growth in Silicon Steel."
J. H. Hall, "Shock Tests of Cast Steel."
G. H. Clevenger and B. Ray, "The Influence of Copper Upon the Physical Properties of Steel."
J. H. Hall, "The Life of Crucible Steel Furnaces."

A New Johns-Manville Branch

The spirit of business enterprise which characterizes the H. W. Johns-Manville Company is once more evidenced by the opening of a new office and warehouse in Galveston, Texas. The company now boasts three offices in the Lone Star State, namely, at Houston, Dallas and Galveston. At the last named place, in a modern brick warehouse of large proportions, will be consolidated the stock for distribution to the different offices and throughout the Texas territory. Galveston, because of its location and shipping facilities, makes an ideal concentration center. The company plans to receive direct at this point heavy shipments by coastwise lines from New York. The steadily increasing trade with Central and South America also makes Galveston a convenient point of distribution.

The H. W. Johns-Manville Company is among the country's largest houses dealing in roofing, building materials, packings, pipe coverings, insulating materials and electrical goods, and is the world's largest manufacturer and distributer of asbestos goods. It owns extensive asbestos mines in Canada and has nine factories located in various cities in different parts of the United States.

The directors of the Massillon Foundry & Machine Company, Massillon, Ohio, have voted to increase the capitalization from $100,000 to $200,000 to meet the demands of increasing business.

Iron and Steel Institute Brussels Meeting

Discussions on Uses of Blast Furnace and Coke Oven Gases, Armor-Piercing Projectiles and the Electric Refining of Steel in the Frick Furnace

Discussions on several important papers dealing with iron and steel metallurgy developed at the Brussels, Belgium, meeting of the Iron and Steel Institute, September 1 to 4. We have already given (p. 624, September 18) the comments on the paper of Benjamin Talbot on "Modern Open-Hearth Steel Furnaces." The report below gives in the main the discussion on other papers presented at the meeting.

Blast Furnace and Coke Oven Gases

The papers of E. Coppée on "Coke Making in Belgium" and of Gevers-Orban on "Tar Distillation" (*The Iron Age*, September 11, p. 589) were discussed together.

Alfred Hutchinson said that England was very slow in taking up the use of by-product ovens, because when coke was made apart from blast furnaces it was not very important to obtain a high gas yield. He believed that British bricks were as good as Belgium and there were brickmakers of Durham and Yorkshire supplying bricks quite good enough to stand up to several years' work. He believed in the direct process of recovering by-products because in the first place it was possible to save losses of ammonia compounds and in cooling down the gases it was possible to get out the various products separately. First the tar was recovered, then the gases passed through compressors and naphthalene was obtained. Then, the gases being cooled further, benzol was recovered, and by the direct process ammonia was obtained in the form of ammonium chloride which was more valuable than ammonium sulphate. J. H. Darby thought Continental bricks were better than British. The method of tar distillation depends upon the price of the various products. In Belgium it pays best to make the largest percentage of pitch.

In discussing the paper of E. Houbaer on "Blast-Furnace and Coke Oven Gases" (*The Iron Age*, September 18, p. 608) Dr. O. Petersen, Düsseldorf, instances a case in which blast-furnace gas was used, where, owing to the variations in the quality and quantity of the blast-furnace gas, it was found necessary to use oil to help the furnace along when necessary. In other cases, the mixing of blast-furnace and coke oven gases had been adopted with satisfactory results. German rolling mills and steel works were becoming more and more dependent on blast-furnace and coke oven gas, and the fluctuating output of gas from blast furnaces might cause trouble at times to the mills and steel works.

T. C. Hutchinson, Skinningrove, England, said that in July, 1911, his Talbot furnaces were set at work, the heating furnaces being supplied with gas from producers. At the same time 60 coke ovens were being built, which, however, were not ready until October. In July he rolled down ingots heated by blast-furnace gas only, the mills being driven by electrical power supplied by gas engines. For two months this process was continued. In October, 1911, the coke ovens being completed, he enriched the blast-furnace gas to 130 B.t.u. and it was then supplied to the soaking pits, which had been using pure blast-furnace gas. He then started a second soaking pit in which he used a much richer gas than that used in No. 1. For the purpose of distribution, the coke oven gas was passed direct into the unwashed blast-furnace gas main, whence it passed through water scrubbers and Theissen washers, and was distributed to all parts of the works. They thus obtained a gas resembling producer gas of 130 to 140 B.t.u. per cubic foot. With the further quantities of gas obtained from the new battery of coke ovens which were being built, they would be enabled to enrich the gas to from 160 to 170 B.t.u. per cubic foot, and either of these gases would be capable of use for any purpose in any part of the works. For the purpose of duplication, he had roped his works around with a separate coke oven gas main, so that coke oven gas or blast-furnace gas could be used separately in the event of any possible breakdown. By this independent plan he was able to send specially rich gas to any unit, as and when required.

Oxygen in Blast Furnace Practice

The paper of G. Trasenster on "Oxygen in Blast Furnace Practice," of which a synopsis was given in our issue of September 11, p. 569, brought out little discussion, because little has been definitely learned of results. Discussing the paper, J. T. Stead said that for generations it had been recognized that the use of pure oxygen would give great economy, but the industry has been waiting for someone to do the necessary experiments. The author had indicated the results which had been obtained hitherto, and he hoped the figures would be borne out in continuous practical working. Greville Jones asked if any depreciation in the lining of the furnace had been noticed due to the per cent. of oxygen used. Mr. Trasenster replied that no such effect had been noticed as yet, but the experiments had only been going on for a month. It was possible that he might make experiments with pure oxygen, in which case there might be some effect upon the lining, but if the temperature was too high he thought this could be regulated.

Armor-Piercing Projectiles

A paper by Gen. L. Cubillo dealt with "The Manufacture of Armor-Piercing Projectiles." In the discussion Dr. A. Grieves said that M. Girod, after long experience with projectiles, used the following compositions of steel:

Nickel	4 per cent.
Chrome	1.5 per cent.
Carbon	0.5 per cent.

with the addition of 0.2 or 0.3 per cent. of molybdenum, vanadium, or tungsten. He annealed at about 600 deg., and the hardness obtained by hardening in air was very good indeed. Personally, he was very astonished when he saw M. Girod's process at work in Savoy to notice that the ingots from which the projectiles were made were only twice the section of the finished projectile. Perhaps Sir Robert Hadfield would give a little information of the process by which he made projectiles without forging. M. Girod's shells of 14 in. diameter were accepted by the French Government, so that the process by which they were made could not be regarded as experimental.

Capt. N. T. Belarew said that the large use of castings at Hadfield's Steel Foundry, the Swedish Works at Boforce, the Kolpina Works, and especially the opinion of Professor Tchernoff, seemed to give support to the view that projectiles should be cast.

Sir Robert Hadfield said that tungsten, which had made it possible greatly to increase the output of mechanical shops, was discovered by two Spaniards. In dealing with a subject of this kind he could not say all he should like to, because the British Government very properly imposed a certain amount of secrecy upon those Englishmen who were privileged to visit the proving grounds at Shoeburyness, or elsewhere. He thought Sheffield could still hold its own in projectiles, but the problem was not easy when one remembered today that the largest shell was 15 in., and even 16 in. in America. When such a shot struck a plate there was a striking energy of 15,000 ft.-lb. of energy, and as all that work which was concentrated for a millionth part of a second on the extreme point of the shot, the steel of which the point was constructed must be very well prepared and hardened and tempered. He was glad that the paper was withdrawing the veil a little from the secrets of the hardening shops, although, quite wisely, the writer did not deal with all of the points. One matter referred to was the cap, but he did not think sufficient stress had been laid upon this. Without a suitable cap, the best projectile in the world could do no work. There was a disposition to depreciate British work, but the great-

est and most modern advance in projectile caps is English, and today the navies of the world are being equipped with shells having a cap devised by the Master Cutler of Sheffield and himself. The ordinary cap was known as the flat cap, for which we were greatly indebted to an American, as the result of firing, accidentally, a shot against the wrought-iron side of a plate. Subsequent experiments produced what was known as the Johnson cap, which had done very well under certain conditions. The latest form was of a type in which the point was well protected, and the chief navies of the world were now being equipped with it There was a hole inside the protection to the cap, and even experts could not quite explain what happened, but it was believed that by taking away some of the metal, the cap was able to imbed itself more exactly on the plate, while the point was still protected at the side and was able to bring enormous energy on the face of the plate. With regard to hardening, it was absolutely necessary to be exceedingly careful in the preparatory state of dealing with the material for the projectile. When it was remembered that it was necessary to convert the front portion of a 15-in. caliber shell from the soft condition into one absolutely so hard that it would scratch glass, it must be confessed that even the allotropic theory did not help to solve those problems met with in such large masses of steel.

The Frick Electric Furnace

In an elaborate paper on "The Electric Refining of Steel in an Induction Furnace of Special Type," Otto Frick gave some results of the operation of the Frick furnace at the Krupp works at Essen. The first furnace came into regular operation in August, 1908. The second, originally of the Kjellin type, was rebuilt on the same principle as the original Frick furnace. More extended reference to the paper will be given later in these columns.

D. F. Campbell, discussing the paper, said that Belgium was facing the problem of refining basic Besemer steel, and it was possible that electrical steel in Belgium in the near future would be as cheap as any in the world. In the United States, where there was no basic Besemer, the cost of melting and refining was considerably higher than in Belgium, but probably steel would be made there as cheaply by the duplex process—acid Bessemer and electric. In most other countries, notably in England, there was a very difficult problem, because the quality of open-hearth steel was already so good, and it was more difficult to show an improvement on present practice. Mr. Frick's figures of efficiency and loss were based on a single instance, and were hardly representative of what was being done in current practice. Reference was made to an average loss of 580 kw. hr. per ton of steel in an arc furnace. That was almost exactly the figure at which steel was made in Sheffield during last year, and that allowed for a small loss. Another point was the question of power supply. If an electric furnace could be put on the ordinary machines of a steel works it was a great advantage, because, taking the special case of Belgium, there was one 6000-kw. furnace working from a joint power station, and as soon as there was a shortage of power it was possible to shut down the electric furnace and keep the rolling mills working; but if they had machines of such extremely low frequency as mentioned in the paper, they could not be put on to other work, and it was important that all machines should be interchangeable. With regard to the size of electric furnaces, he was of the opinion that electric furnaces would not be made in the immediate future of very large capacity The 15-ton furnace was quite a commercial unit.

CRUCIBLE STEEL CHAMPIONED

L. M. Ledingham said there were some very fine analyses in the paper, but a fine analysis did not always mean a very fine steel, because with basic steel a fine analysis could be obtained, although the steel was not always the same as acid steel. Numbers of people in Sheffield were interested in the electric furnace because they thought the old crucible process was doomed. Was it possible, as had been stated, to produce a very fine tool steel in the electric furnace from mild-steel boiler scrap? He questioned very much if electric steel would ever be equal to the old high-class crucible steel. He did not think that any process of the kind described would produce good tool steel like that for which Sheffield had long been famous; and in any case, unless the electric process would make it possible to use common steel scrap, it would have little interest to Sheffield. No doubt the process would be of great use where power was very cheap, but it was quite another thing where power cost a good deal of money.

E. Houbaer, of the Cockerill Works, made the point that there had not been given such practical records as would enable conclusions to be drawn as to the actual working of electric furnaces. With regard to the possibility of refining steel and thereby getting rid of the sulphur in induction furnaces, the conditions were difficult to fiulfil with 60 per cent. of lime present unless there was a great reserve of heat, and in that respect the arc furnace had the advantage. The actual consumption of current might be higher with the arc furnace, although the figure given by Mr. Frick—1000 kw.-hr. per ton—was higher than actual observation of Girod furnaces indicated. The final result seemed to be in favor of the arc furnace. The proper use of the induction furnace was for melting; refining proper would be better carried out in the arc furnace.

ARC AND INDUCTION FURNACES COMPARED

Mr. Frick in replying said that Mr. Campbell had misunderstood the table he gave. There was not a word about 580 kw. per ton. The table said that with a 12-ton capacity furnace of the arc type it required 580 kw., according to results obtained at Essen, and that was the kilowatts necessary to keep it hot on an average when cold stock was being melted. When hot metal was melted that figure would probably be far in excess. Mr. Campbell complained that only one furnace had been mentioned in the paper. He was sorry, and he had really had it in mind to enter into a comparison between this furnace and the Heroult furnace from figures he got at Chicago; but it was very difficult to find out exactly what was the power necessary to keep such a furnace hot. Approximately he got a figure of about 800 to 850 kw.; whereas a 12-ton Frick furnace of the same type would require 230 kw. to keep hot. As to the figure of 580 kw. hr. per ton reached in Sheffield, this was, of course, very difficult to discuss. With material that was very clean, without rust, say a high-carbon steel cast at 1520 deg. C., which was the general practice in crucible steel, it would take less power. The furnace refining losses were much smaller. At the Krupp works he had melted at 1680 deg. C., and that made an enormous difference in the work to be put in. Mr. Campbell also said that he did not think the big electric furnace would have any future and mentioned 15 tons. He regarded that as a very big size, and he agreed with Mr. Campbell that 15 to 20 tons would probably be the general practice. The electric furnace would generally be arranged at about the same size as the Bessemer converter. Nevertheless, he did not think there would be any difficulty in making 25-ton furnaces of this type. As to the efficiency of the electric furnace, this depended on how much power was put into it. With a furnace taking 500 kw., the radiation losses were about 250 kw., so that the efficiency was about 50 per cent.; but if the furnace was charged with 1000 kw. the losses were practically the same, viz., 250 kw., so that the efficiency was 75 per cent. On the other hand, the furnace had to be worked so much harder. Mr. Ledingham had asked about the crucible. The electric furnace would replace the crucible in certain cases, but generally speaking the material that was produced in the crucible was of such high quality and price that whether it cost a few shillings more or less in the electric furnace did not matter, and was of no importance. Further, crucible steel of this high quality was made in such small quantities that it did not pay to use the electric furnace. The importance of the electric furnace would be in the treatment of the more ordinary steel, such as structural steel. The advantage of the electric furnace was the reducing atmosphere in it. A crucible steel was good in his opinion, because there was a slag on the top of the crucible that was acid and this could be allowed to be comparatively thick. Any acid slag would hold ferrous oxide very strongly, and would not allow it to go into the steel, and, therefore, good steel was produced. In an acid open-hearth steel furnace there was a thin slag. With the crucible there was very little alumina, but not so much ferrous oxide; but with the acid open-hearth furnace there was an enormous amount of ferrous oxide, which would travel from the slag into the bath. With the basic process, in the presence of lime the

effect of ferrous oxide was very small. It would not stay in the slag, and one did not know whether it was there or not; but with the electric furnace there was the possibility of reducing the slag, and, none being present, there would be no oxide in the slag, and that was what he called the meaning of refining. In the electric furnace, ferrous oxide was one of the greatest enemies of steel. He had been asked the cost of converting cold scrap into steel in the electric furnace. He would not recommend such work in an electric furnace, because it was too expensive. One could melt much more cheaply and as well in the open-hearth furnace. With the latter there was an average efficiency of 20 per cent., but in the beginning it was about 50 per cent. When the metal was cold and the gases hot there was a great transfer of energy, and consequently high efficiency; but that efficiency went down later on to 5 per cent., whereas with the induction furnace described in the paper, if the same gases were put into a gas engine to produce electricity for driving the electric furnace the efficiency could be increased to 18 per cent., so that the proper way to melt cold scrap was to melt in an open-hearth furnace and transfer it to the electric furnace, and arrange it in such a way that there was the least possible energy consumption.

Steel Corporation Exports Benefit the Country

Some misunderstanding appears to exist as to the United States Steel Corporation's connection with the American & Cuban Steamship Company. A recent newspaper article quoted a so-called steel shipper to the effect that the corporation was cutting freight rates through the Steel Products Company, its export subsidiary. This is denied by shippers as well as by the Steel Corporation.

The Steel Corporation has chartered four vessels through the American & Cuban Company. They will fly the American flag, the first to do so in the South American trade in 20 years or more. The vessels will carry the products of the Steel Corporation, but will be loaded by the American & Cuban Company. On their return trip it is probable that these vessels will bring manganese ore.

A Steel Corporation official, speaking of the situation, says: "We make no rates whatever. We have chartered these vessels to carry our products to South America. If there is any space after our cargoes are loaded, the loaders will take other freight at whatever rates they see fit at the current level. Our export business, about 2,200,000 tons this year, is too large to ship in private vessels, so we charter as many extra boats as is necessary."

It is not generally known, except among shippers, that the Steel Corporation is a great aid to the general export trade of this country. The vessels of the corporation touch at a number of unimportant foreign ports which no regular line reaches; therefore, by carrying products of other kinds than steel, markets are opened to this country which would otherwise be left to Europeans.

Blowing in a New Canadian Furnace.—The Canadian Furnace Company, Ltd., which is controlled by Buffalo Union Furnace Company interests, Buffalo, will blow in its new blast furnace at Port Colborne, Ont., on Saturday, September 27. Invitations have been issued to a number of iron and steel men, who will go by special train on the Grand Trunk Railroad, leaving Terrace station, Buffalo, for Port Colborne, Saturday morning. Lunch will be served on the steamer Mojeska, leaving the furnace dock at 12.15 for Thorold, giving opportunity to view the Welland Canal district to the point where the new canal will be constructed to Lake Ontario.

Conditional awards of contracts for six new torpedo boat destroyers have been made by Secretary of the Navy Daniels, as follows: Two to the New York Shipbuilding Company, at $825,000 each; two to the William Cramp & Sons Ship and Engine Building Company, at $881,000 each; one to the Fore River Shipbuilding Corporation at $861,000, and one to the Bath Iron Works, at $884,000. Each will be 310 ft. long, 29 ft. 10 in. beam and 9 ft. 3 in. draft. All will be exclusively oil burners and propelled by steam turbines.

July Iron and Steel Exports and Imports

The July report of the Bureau of Foreign and Domestic Commerce shows the iron and steel exports for July to have been somewhat less than those for the previous month. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, in July was $24,170,604, against $25,228,346 in June. The exports of commodities for which quantities are given totaled 237,157 gross tons in July, against 243,188 tons in June. Import values for July, $3,080,683, did not differ greatly from those of June, which were $3,291,875.

Details of the exports of tonnage commodities for July and for seven months ended with July, compared with the corresponding periods of the previous year, are as follows:

Exports of Iron and Steel

	July		Seven months	
Commodities	1913, Gross tons	1912, Gross tons	1913, Gross tons	1912, Gross tons
Pig iron	18,361	16,386	165,024	148,703
Scrap	7,076	6,429	59,074	62,191
Bar iron	1,407	3,513	9,929	11,895
Wire rods	3,574	3,444	47,199	37,223
Steel bars	13,207	19,903	135,429	105,816
Billets, ingots and blooms, n. e. s.	5,831	29,293	77,696	165,248
Bolts and nuts	1,840	1,562	13,488	*1,562
Hoops and bands	781	1,143	11,042	5,650
Horse shoes	122	122	770	*122
Cut nails	444	529	2,186	6,776
†Railroad spikes	1,086	580	7,661	*580
Wire nails	4,523	6,950	28,048	44,268
All other nails, including tacks	291	441	2,468	6,607
Pipes and pipe fittings	25,048	20,768	190,591	153,935
Radiators and cast iron house heating boilers	620	533	5,053	2,263
Steel rails	56,233	46,194	288,458	271,747
†Galvanized-iron sheets and plates	7,617	14,264	52,755	*14,264
All other iron sheets and plates	2,012	5,399	16,832	112,399
Steel sheets and plates	....	....	....	§150,721
†Steel plates	22,178	25,277	194,533	*25,277
†Steel sheets	10,796	6,706	77,240	*6,706
Structural iron and steel	37,604	32,265	248,514	164,685
Tin and terne plates	3,435	8,763	40,519	54,165
Barbed wire	6,514	7,693	44,610	54,319
All other wire	6,557	14,621	70,647	89,568
	237,157	272,778	1,789,766	1,696,690

*Figures cover period since July 1, 1912.
†Not separately stated prior to July 1, 1912.
§Figures are for six months, January to June, inclusive.

In July the imports of commodities for which quantities are given totaled 39,694 tons, against 36,597 tons for June. Tin and terne plate imports, which had increased from 2862 tons in May to 7726 tons in June, declined to 3648 tons in July.

Details of the imports of commodities for which quantities are given for July and the seven months ended with July, compared with the corresponding periods of the previous fiscal year, are as follows:

Imports of Iron and Steel

	July		Seven months	
Commodities	1913, Gross tons	1912, Gross tons	1913, Gross tons	1912, Gross tons
Pig iron	16,404	8,728	98,124	64,604
Scrap	9,218	1,476	34,888	9,595
Bar iron	3,947	4,238	19,143	15,377
Structural iron and steel	1,760	130	7,911	1,396
Billets, bars and steel plates, n. e. s.	2,482	1,503	13,930	10,785
Steel rails	575	88	3,510	1,779
Sheets and plates	402	536	2,138	1,847
Tin and terne plates	3,648	64	15,236	1,052
Wire rods	1,258	1,119	10,594	8,380
Totals	39,694	17,882	205,474	114,815

The imports of iron ore in July were 272,017 gross tons, against 241,069 tons in June, 191,860 tons in May and 185,677 tons in July, 1912.

The total value of the exports of iron and steel and manufactures thereof, not including iron ore, for the seven months ended with July was $179,703,454, showing a heavy gain on that of the corresponding period of last year, which was $164,963,425. The total value of the imports of iron and steel and manufactures thereof, exclusive of iron ore, for the seven months ended with July, 1913, was $20,872,124, against $15,960,533 for the corresponding period of 1912.

Mattie furnace of the Girard Iron Company, Girard, Ohio, was blown out this week for relining and repairs and will probably be out from six weeks to two months.

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Railroad Earnings and Prospective Expenses

Railroad earnings in the fiscal year ended June 30, 1913, were easily the best ever reported, from the standpoint of either gross or net; but the operating ratio itself is far from the best. The gross earnings per mile of line show an increase of 14 per cent. over the period three years earlier, while on account of the material increase in mileage the total business done by the entire railroad system of the country has increased much more than this 14 per cent. The operating expense has increased by about 19 per cent., which leaves it that the net operating revenue has increased only slightly—by about 4 per cent. per mile of line—but it has actually increased.

It is always difficult to make exact comparisons year by year of railroad earnings, for the reason that the mileage and of course the capital investment is constantly increasing. The annual reports of the Interstate Commerce Commission are too belated to be of interest, while its monthly returns for a period of years are not strictly comparable by reason of the fact that prior to November, 1911, the summaries included returns from all railroads, while beginning with that month the summary has included only those from roads having an annual revenue of $1,000,000 or over. The Bureau of Railway Economics, using the same reports as are filed with the commission, follows the same practice, but publishes its returns considerably earlier than the commission. Its showing, published within the past few days, covers the fiscal year ended June 30, 1913, and from this and previous reports the following table is constructed. The figures are per mile of road reporting. For the past two years they include roads having $1,000,000 annual revenue, embracing about 90 per cent. of the country's total mileage, while for the two preceding years they include roads having more than 50 miles of line. The comparison is thus fairly exact, but not absolutely so.

Railroad Earnings per Mile of Road—Fiscal Years

	Operating revenue	Operating expense	Net operating revenue
1910	$12,067	$8,007	$4,060
1911	11,997	8,243	3,754
1912	12,730	8,803	3,927
1913	13,781	9,550	4,231

As already indicated, the increases from 1910 to 1913 are 14 per cent. in operating revenue, 19 per cent. in operating expense and 4 per cent. in net operating revenue. The operating ratio shown was 66.3 per cent. for 1910 and 69.2 per cent. for 1913. In view of the fact that these statistics are purely per mile of line, or per unit of capacity, the swing is obviously in an unhealthy direction. A manufacturer expects his unit cost of production to decrease the more fully his capacity is engaged. The railroads have occasionally made the claim, in an academic way, that as the density of traffic increases the cost of handling it increases, but usually the claim is made that the increases in operating expense in recent years have been due to higher wages and higher costs of commodities; in familiar terms, that the railroad cost of living has advanced.

It is not sufficient to assert that while the operating expense has increased the operating revenue has still more increased, so that the net operating revenue has undergone some increase, though a much smaller one. The railroads insist that they must look to the future, which involves heavy expenses for them, with no reasonable indication that earnings will grow sufficiently to meet such largely increased expenditures. A large part of the expenditures required, and likely

to be required in future, are according to the rules of the Interstate Commerce Commission chargeable to operation. Many of these expenditures do not, it is claimed, decrease the cost of operation, whereas they decrease the earnings and therefore reduce the ability of the railroads to raise fresh capital, requisite for other improvements. According to many accounts it was possible in the old days to produce a favorable showing by purely bookkeeping methods and thus encourage the inflow of fresh capital when needed, the practice being successful unless repeated at too frequent intervals.

Of this nature, involving charges to operation, are many of the railroad improvements now demanded by the public, including abolition of grade crossings, the use of heavier or better quality rails and the replacement of wooden passenger train cars by steel construction. A portion of these expenditures may be chargeable to capital account, but the bulk of them must be charged to operating expense. If the railroads are able to survive the ordeal, they will eventually be in better and stronger position than ever. The real issue raised is one of time. There is a popular desire that the regeneration be accomplished in a short period of years, while the railroads claim conditions do not warrant such speed. In the case of replacing wooden by steel cars there is a physical consideration which runs directly counter to the financial considerations. The mixture of wooden and steel cars in operation is generally conceded to be particularly dangerous, the results of collisions being more dangerous from such mixture, either by mixture of steel and wooden cars in the train or by the opposition of a full steel train to a full wooden train. The dictum of physical considerations is that the entire change should be made at once; that of financial considerations is that the change should be spread over a long period of years.

It is encouraging to observe from the latest statistics that the net operating revenue of the railroads has been increasing, even though by a small margin. But while the condition at the moment is good, fears are rightly entertained as to the sufficiency of earnings for the great demands which are being made upon the railroads as to their future conduct. This aspect of the case of the railroads accounts for the more favorable reception now given to the proposal for an advance in freight rates in official classification territory than it received in 1910.

The New Tariff

From present indications the business of this country will be conducted under a completely new tariff before the next issue of *The Iron Age* appears. It is believed that the bill now in conference will be perfected, agreed to in the House and Senate, and signed by the President not later than next Tuesday. Efforts to ascertain the status of certain duties in the metal schedule which have been the subject of controversy, such as ferromanganese and some other commodities, have not been successful, as the conferees have declined to give out information until an agreement has been arrived at on all provisions. With these few exceptions the rates to be imposed by the new act are accurately known. The act goes into effect on the day following its passage.

The enactment of the Underwood-Simmons bill will mark a completely new era in the tariff history of this country. For over a half century the country has been operating under a protective tariff, as even the provisions of the Gorman-Wilson tariff, which was in existence from 1894 to 1897, carried duties which were highly protective as compared with the rates in the Underwood-Simmons measure. In fact, the business interests of the country had become so accustomed to a tariff which carried with it some protection to native industries that up to a comparatively short time ago no serious attack was being made on the protective policy. Even the South, the home of free trade, was becoming tinged with protective leanings. It was not believed by the great body of business men that any party that might come into control of the Government would sweep away almost all vestiges of protection. The Underwood-Simmons measure, however, shows how mistaken these views were. It shows how, in the mutations of parties in this country, it is possible for those temporarily in control of the Government to reverse completely policies and principles which have been in force so long as to be almost considered as part of our Government structure.

It is perhaps because the change in tariff duties to be made is so sweeping that not much has been heard in the way of serious protest from interests attacked. It is true that the sugar producers, the wool growers and some of the textile manufacturers have made heroic efforts to have duties more favorable to them inserted in the bill on its passage through the House and the Senate. Other great manufacturing interests, however, have not made themselves prominent, either in their denunciations of the measure or in their attempt to have more favorable duties incorporated. Here and there an individual manufacturer has raised his voice, and a few others have submitted protests at the perfunctory hearings granted, but there has been no general attack on the bill nor widespread effort to influence public sentiment in the hope of changing the attitude of those in charge of the bill. This disposition to maintain calmness in the face of a most serious attack on their interests has been taken by many as indicating indifference to the impending changes in the tariff. It appears to be assumed, simply because manufacturers have not been holding indignation meetings or invading the halls of Congress in overwhelming numbers, or making frantic appeals by mail and wire to their Senators and Representatives, that the drastic cut in duties was being accepted philosophically, as something which had to be borne, but which easily could be endured. This is far from being the true state of the case. The manufacturers have perceived the futility of putting forth any great amount of energy in trying to change the attitude and views of the leaders of the dominant party in Congress. They have recognized the fact that the President of the United States has been determined to have his administration marked by a complete departure from the policy which has ruled this country and its developments for half a century. They feel that they are simply compelled to endure what the President and the majority in Congress may see proper to inflict upon the country.

The question now comes up as to what effect the new tariff is likely to have on the iron trade. It is remarkable indeed that with such impending savage reductions in duty the markets of the country have not shown a greater tendency toward lower levels. Possibly this may be due to the fact that human nature rarely prepares itself for a theoretical catastrophe. It is difficult to anticipate what may happen a month or

two or three months hence or may never happen. It is possible that the changes in duties which may now be assumed to be upon us will have an early effect, in view of the recent heavy decline in prices on iron and steel products in Europe. Take, for instance, present prices in this country and Europe on steel billets, which are on the free list. These are quoted at $25 at Philadelphia and at $19.46 f.o.b. Antwerp. The difference of $5.54 per ton is so large as to provide for a liberal freight rate and allowance for commissions and insurance, and leave a handsome margin for either a profit to the shipper or a reduction in price to meet some lowering of the American price. Wire nails and other wire products and hoops, which go on the free list, will certainly be the object of attack by foreign makers. The reduction in rates of duty on bars, shapes and other forms of finished steel is sufficient to enable such products to be laid down on our seaboard considerably under existing American prices. A readjustment will inevitably have to be made along the seaboard, if not for some distance into the interior. The whole list of iron and steel products, in fact, presents opportunities for the invasion by foreign manufacturers of the markets of this country unless our producers lower their prices to meet the competition.

It is a gratuitous assumption that the American manufacturer under the new conditions is about to "open his prison doors" and walk out. Those who argue that the American manufacturer has so far been fettered, and that he is now to be released from his chains and made free to fight the world, have a distorted view of the conditions under which business is conducted and trade is won. Our manufacturers will not give up their home markets or any part of them without a struggle. That much we know. Whether the struggle will result in a severe reduction in American prices or whether the necessary readjustment will happily prove to be of small proportions is something that the future only can solve.

Advancing Money to Workmen

One of the puzzling questions in the management of manufacturing plants, and in fact of all establishments where men and women are employed, is that of advancing money on wages yet to be earned. The practice is generally discouraged—the rule is against it. However, the exception is occasionally made.

To one inexperienced with the handling of working forces a lenient attitude seems the natural one. A man has had bad luck and his resources cannot stand the strain upon them. He asks for the money which he will earn the next week, with the privilege of paying the debt by a weekly reduction from his pay envelope. Experience has proved that in a majority of cases the favor works out badly, both for the borrower and the lender. A certain sense of restraint ensues. The man to whom the favor has been accorded develops a degree of resentment. And, unfortunately, he may give up his job before his debt is paid. In other words, the average applicant for the advance is ungrateful and unworthy. The right sort of man seldom requires such assistance. One manufacturer, who has had long experience in handling the finances of a large plant, makes the statement that if an employee is the sort of man to whom money should be given under the circumstances indicated, he would as soon loan him $50 as the wages of a week. The individual who would be assisted, in such a view of the matter, is a tried man, an old employee. The reasons he presents are taken as strict truth. That he will live up to his agreement is never doubted. He has earned a place with his employers which entitles him to consideration. It is a rare case where such a man fails to make good his obligation. And he is a more valuable unit in the industrial machine, for in his gratitude he will do everything possible to return favor for favor as the opportunity may arise.

The rule as to payment of earnings in advance is usually applied to assignments of wages. The practice of improvident and extravagant people of borrowing money or securing credit with the tying up of wages as security would grow beyond all limits were employers not firm in their refusal to be parties to the transactions. The penalty usually is summary dismissal. The same attitude is taken concerning attachments of wages for debt. The sheriff is an unwelcome caller in any office. But here also the employer occasionally finds opportunity for the protection of his workmen. Unjust claims of the usurer and unscrupulous merchant are often behind such proceedings, and such protection is given the victim as the law will permit. Ignorance may be preyed upon by a certain class of lawyers through the machinery of the sheriff's office, and it takes the intervention of the employer to prevent extortion. The manager must be a good judge of men in order to meet the problem with the best results to his works and the workers.

For a Government Armor Plate Plant

Announcement is made that President Wilson in his first annual message to Congress will urge the building of a Government armor plate plant. At the Navy Department emphasis is put in this connection on the decision just made to appoint Capt. Joseph Strauss as Chief of the Bureau of Ordnance. It is given out that this was not decided until the armor plate situation had been canvassed and Captain Strauss had declared for a Government plant. The Secretary of the Navy has not yet received the details of costs of armor plate making which he asked the three firms to submit, whose identical bids were recently opened at Washington. In the case of the Steel Corporation these figures are already on file with the Government, having been collected in the inquiry of the Bureau of Corporations. The manufacture of armor plate by the Government has been thoroughly canvassed by the Navy Department on other occasions. In 1897 an inquiry was conducted by an Army Factory Board appointed by the then Secretary of the Navy, John D. Long. Plans and specifications were prepared, with John Fritz as consulting engineer, and were published in a volume of considerable size. A large expenditure of money was made on the inquiry, but it resulted in no action by Congress.

Austrian Syndicate Fine for Overselling.—The Austrian Bar Iron Syndicate recently fined one of its members, the Rokitzaner Stabeisenwerk, of Rokitz, $80,000, according to the London Iron and Coal Trades Review. The company was allotted an annual quota of 450 carloads of bar iron; it was discovered, however, that it had disposed of 200 carloads more which it had not disclosed. The company's defense was that the excess quantity had been contracted for before it joined the syndicate. The defense was rejected.

The Bureau of Standards Washington, D. C., has just issued Circular No. 42, entitled "Metallographic Testing." Its purpose is to bring before those interested the tests of this nature which the Bureau is equipped for carrying out and the conditions under which such tests are made.

Greater Trade Press Efficiency

Principles on Which It Can Be Secured in the Interest of Business and the Public

With an attendance of more than 550 and a programme of 60 papers and addresses, the convention of the trade and technical press of the United States, held at the Hotel Astor, New York, September 18, 19 and 20, gave a remarkable demonstration of the strength and growing efficiency of that branch of journalism. It was the eighth annual convention of the Federation of Trade Press Associations in the United States and its keynote was "Business promotion through trade press efficiency." Of the 715 class, technical and trade journals in the country, 241 of the leading papers are included in the federation, these representing 75 different trades, industries and professions. The chief development of the convention of last week, and one in which many readers of *The Iron Age* have an interest, was the adoption of a declaration of principles. It may appropriately be prefaced with the statement that at the convention's editorial symposium of September 18, attended by more than 350 publishers, editors and others, emphasis was put on the responsibility of the editor of a class journal, not merely to the business organization of which he is a part and to the industry to which his journal is devoted, but to the public as well. It was urged that the technical or trade journal "should not be a special pleader for its industry against the world, counsel for the defense and professionally blind and deaf to the other side of the case," but that it should treat the problems involving the relations of that industry to the public from the broad view of the public interest. The convention's declaration of principles is as follows:

1. We believe the basic principle on which every trade paper should build is service—service to readers and service to advertisers, in a way to promote the welfare of the general public.

2. We believe in truth as applied to the editorial, news and advertising columns.

3. We believe in the utmost frankness regarding circulation.

4. We believe the highest efficiency of the business press of America can be secured through circulations of quality rather than of quantity—that character, and not mere numbers, should be the criterion by which the value of a publication should be judged.

5. We believe in co-operation with all those movements in the advertising, printing, publishing and merchandising fields which make for business and social betterment.

6. We believe that the best interests of manufacturers, the business press and consumers can be advanced through a greater interchange of facts regarding merchandise and merchandising and to this end invite co-operation by manufacturers and consumers.

7. We believe that the logical medium to carry the message of the manufacturer directly to the distributor and the user is the business press.

8. We believe that while many advertising campaigns may profitably employ newspapers, magazines, outdoor display, etc., no well-rounded campaign seeking to interest the consumer or user is complete without the business press

9. We believe in co-operating with all interests which are engaged in creative advertising work.

10. We believe that business papers can best serve their trades, industries or professions by being leaders of thought; by keeping their editorial columns independent of the counting room, unbiased and unafraid; by keeping their news columns free from paid reading notices and puffery of all kinds; by refusing to print any advertisement which is misleading or which does not measure up to the highest standards of business integrity.

The strike of the manganese mine workers in the Caucasus has been settled and the men have returned to work. Most of the demands of the strikers have been granted by the mine owners. The conditions under which work has been resumed are an 8-hour working day, improved barrack accommodations and living quarters for the married men to be furnished by the mine owners, daily wages in most branches of work to be increased by 20 to 25 per cent. and wages for piecework to be increased 75 to 80 per cent.

Beaver Dam Malleable Iron Company's Failure

The Beaver Dam Malleable Iron Company, Beaver Dam, Wis., one of the largest producers of railroad malleable castings in the Middle West, is operating under a receivership, following the filing of a voluntary petition in bankruptcy at Milwaukee, September 16. Ernest E. Smythe, Milwaukee, was appointed receiver under bond of $50,000, with instructions to continue to operate the plant as a going concern. A resolution that a voluntary petition in bankruptcy be filed was adopted at a meeting of the board of directors September 15. Five days previously, or on September 10, D. P. Lamoreaux tendered his resignation as president and as a director. The other officers are: Vice-president, Lawrence Fitch, Milwaukee; secretary, B. F. Sherman; treasurer, M. A. Jacobs; directors, C. Starkweather, J. W. Miller, C. W. Lamoreaux.

The total assets of the company are approximately $855,000 and the total liabilities $500,456.42. Accompanying the petition was a statement showing fixed assets on the books at the close of the fiscal year, June 30, 1913, of $741,144.40, and working assets as of September 13, 1913, of $213,923. The company has a large number of excellent contracts. It employs 500 people and the average monthly payroll is $45,000. During the last fiscal year the payroll aggregated $555,602.46.

The principal contract is with the Chicago, Milwaukee & St. Paul Railway Company for all of its requirements of tie plates and malleable iron castings. The contract is subject to cancellation by either party on 60 days' notice. Another large contract is that with the Bettendorf Company, Davenport, Iowa, for its entire requirements of malleable castings. This contract expires January 21, 1917. Other companies, the contracts with which read so as to expire at any time on six months' notice, are the Oregon Short Line, Union Pacific Coal Company, Union Pacific Railway Company, Utah Light & Power Company, Oregon-Washington Railway & Navigation Company, Southern Pacific Railway Company, Northwestern Pacific Railway Company, St. Joseph & Grand Island Railway Company, San Pedro, Los Angeles & Salt Lake Railway Company, Pacific Electric Railway Company and McKeene Motor Car Company. The principal creditors are: Lawrence Fitch, Milwaukee, $150,000; German National Bank, Beaver Dam, $15,000; First National Bank, Milwaukee, $15,000; National Exchange Bank, Milwaukee, $55,000; Thomas Furnace Company, Milwaukee, $29,000.

Colorado Fuel & Iron Company

The following statement has been issued, showing the company's income account for the fiscal year ended June 30:

	1913	Increase
Gross earnings	$24,315,887	$47,435
Operating expenses	20,695,621	199,350
Net earnings	$3,620,266	*$152,015
Other income	755,620	78,922
Total income	$4,375,985	$73,079
Interest and other charges	2,648,703	957
Surplus	$1,727,192	*$74,036

*Decrease.

In the suit of the Trussed Concrete Steel Company against the Corrugated Bar Company, Buffalo, for infringement of its Hy-Rib patents by the Corr-Mesh material of the latter company, Judge Hazel, in the United States Court, Buffalo, handed down a decision September 8 in favor of the defendant. The decision limits the Hy-Rib patent to the specific construction shown and described, and states that the "claims barely escape anticipation by the references cited." This case has aroused considerable interest in the building trade on account of the prominence of the two companies and the important position occupied by their respective materials.

The Standard Tin Plate Company, Canonsburg, Pa., announces that it is in position to supply tin plates lacquered, in addition to its general line of regular coke grade and high-class qualities that it has hitherto been accustomed to supply to the trade.

The Iron and Metal Markets

New Iron and Steel Duties

Conditional Pacific Coast Sales

Small Recessions in Prices an Indication of Continued Large Consumption

While the new tariff law is expected to be in force by another week, with many iron and steel products added to the free list and duties on others much reduced, the market gives few signs of so great an impending change. For some time foreign bars and other products have been quoted for Pacific Coast delivery at prices contingent on the proposed low duties going into effect. Some American inquiries for European billets are reported. Like recent inquiries from this side for English pig iron they are more an effort to find what could be done than actually to buy.

The impressive fact in the present situation in steel products is the slight extent to which prices have yielded in view of the prominence given to the slowing down of demand in so many lines. September has not borne out the predictions of a fall buying movement, and yet it has not fallen far behind the August rate of new orders. Indications are that the Steel Corporation's bookings will average nearly as well as last month's. Its shipments have been at practically the same rate—around 40,000 tons a day.

It is probable that the first of the large rail orders for 1914 will come out shortly, giving some basis for gauging the railroad demand. From the standpoint of Southern mills the rail outlook is not particularly encouraging. For early shipment, recent orders include 4000 tons for the Trona Railroad Company, of California, placed at Chicago; 3000 tons for the Pacific Great Eastern, of British Columbia; an export order of 1000 tons for the Peruvian Central, and 3000 tons for October shipment to the Lehigh Valley.

Steel bars are still the strongest product on the list; even the railroads make bars an exception to their general policy of light buying. The mills have so much business ahead, subject to revision in case of decline, that with current orders they have been able to hold the 1.40c. basis. Iron bars, that have dragged in Western markets for weeks, are somewhat firmer because of the continued wage shutdown of puddling mills.

The supply of structural work has been better, and western fabricators have placed new orders for plain material. New York Central bridge work, an Anaconda Copper Company steel building and Government construction at Puget Sound together represent 5200 tons. In the Buffalo district about 15,000 tons will be let this year for railroad elevated work and the Lackawanna terminal. An inquiry from Los Angeles calls for 2900 tons of plates for an aqueduct.

Some sheet and tin plate plants are down to a 50 per cent. operation. Buyers of sheets continue to hold off and more business is done at 2.10c. for No. 28 black, though sales have been made as high at 2.20c. The tin plate market is between seasons and specifications have been falling off.

The recent activity of smaller open hearth steel plants in seeking orders for billets and sheet bars has established a slight differential in favor of Bessemer material, the larger producers asking 50 cents a ton more in some cases.

The pig iron market shows well-sustained consumption by foundries. Furnace companies are holding the moderate advance established in August and while there is no heavy buying for forward delivery more consumers are covering for the first quarter of the new year. The Pennsylvania Railroad has closed for about 9000 tons of pig iron for its Altoona shops, central and western Pennsylvania furnaces being close competitors for the coke iron. Merchant furnace output is slightly less and stocks of pig iron are declining, though slowly. That foundries are carrying small stocks appears from the fact that there are several times more requests to hurry than to hold up shipments.

More coke can be had at $2.25, at Connellsville oven, since the recent break from $2.50, and some that is close to standard analysis is offered at $2.15.

British and German market reports are less favorable. A number of British blast furnaces have gone out, chiefly those making hematite iron. The German Steel Works Union has made a reduction of 5 marks in prices of steel beams and semi-finished steel for the last quarter of the year.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous.

Per Gross Ton:	Sept. 24, 1913.	Sept. 17, 1913.	Aug. 27, 1913.	Sept. 25, 1912.
Pig Iron,				
Foundry No. 2 X, Philadelphia	**$16.00**	$15.85	$15.75	$16.85
Foundry No. 2, Valley furnace	14.00	14.00	14.00	15.00
Foundry No. 2, S'th'n, Cin'ti	14.25	14.25	14.25	16.25
Foundry No. 2, Birmingham, Ala.	11.00	11.00	11.00	13.00
Foundry No. 2, furnace, Chicago*	15.00	15.00	15.00	16.50
Basic, delivered, eastern Pa.	15.25	15.25	15.00	16.00
Basic, Valley furnace	14.00	14.00	14.00	14.75
Bessemer, Pittsburgh	16.65	16.65	16.65	16.90
Malleable Bessemer, Chicago*	15.00	15.00	15.00	17.00
Gray forge, Pittsburgh	14.25	14.25	14.25	14.90
Lake Superior charcoal, Chicago	14.75	14.75	15.25	17.75
Billets, etc., Per Gross Ton:				
Bessemer billets, Pittsburgh	*24.50*	25.00	25.00	24.00
Open-hearth billets, Pittsburgh	24.00	24.00	24.50	24.50
Open-hearth sheet bars, Pgh.	25.00	25.00	25.00	25.50
Forging billets, Pittsburgh	30.00	30.00	30.00	32.00
Open-hearth billets, Philadelphia	25.00	25.00	27.00	28.00
Wire rods, Pittsburgh	27.00	27.00	28.00	27.00
Old Material, Per Gross Ton:				
Iron rails, Chicago	14.00	14.00	14.00	17.00
Iron rails, Philadelphia	17.50	17.50	17.50	17.00
Carwheels, Chicago	*12.25*	12.75	12.75	14.75
Carwheels, Philadelphia	13.00	13.00	12.50	14.25
Heavy steel scrap, Pittsburgh	12.25	12.25	12.25	14.50
Heavy steel scrap, Chicago	*10.00*	10.25	10.50	13.00
Heavy steel scrap, Philadelphia	11.75	11.75	11.50	14.50
Finished Iron and Steel, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bessemer rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	*1.32½*	1.35	1.37½	1.47½
Iron bars, Pittsburgh	1.55	1.55	1.60	1.45
Iron bars, Chicago	1.35	1.35	1.40	1.45
Steel bars, Pittsburgh	1.40	1.40	1.40	1.35
Steel bars, New York	1.56	1.56	1.56	1.51
Tank plates, Pittsburgh	1.40	1.40	1.40	1.43
Tank plates, New York	1.56	1.56	1.56	1.56
Beams, Pittsburgh	1.40	1.40	1.45	1.40
Beams, New York	1.56	1.56	1.61	1.56
Angles, Pittsburgh	1.40	1.40	1.45	1.40
Angles, New York, future	1.56	1.56	1.61	1.56
Skelp, grooved steel, Pittsburgh	1.35	1.35	1.40	1.30
Skelp, sheared steel, Pittsburgh	1.45	1.45	1.45	1.35
Steel hoops, Pittsburgh	1.60	1.60	1.50	1.45
Sheets, Nails and Wire, Per Pound to Large Buyers:				
Sheets, black, No. 28, Pittsburgh	*2.10*	2.15	2.15	2.15
Galvanized sheets, No. 28, Pgh.	*3.10*	3.15	3.20	3.30
Wire nails, Pittsburgh	1.65	1.65	1.65	1.70
Cut nails, f.o.b. Eastern mills	1.70	1.70	1.75	1.70
Cut nails, Pittsburgh	1.60	1.60	1.60	1.60
Fence wire, ann'l'd, 0 to 9, Pgh.	1.45	1.45	1.45	1.50
Barb wire, galv., Pittsburgh	2.05	2.05	2.05	2.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville, Per Net Ton at Oven:	Sept. 24, 1913.	Sept. 17, 1913.	Aug. 27, 1913.	Sept. 25, 1912.
Furnace coke, prompt shipment.	*$2.15*	$2.25	$2.50	$2.50
Furnace coke, future delivery..	2.25	2.25	2.50	2.50
Foundry coke, prompt shipment	2.90	2.90	2.90	2.75
Foundry coke, future delivery..	3.00	3.00	3.00	2.75

Metals, Per Pound to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.....	**17.00**	16.87½	16.00	17.75
Electrolytic copper, New York..	16.75	16.75	15.62½	17.70
Spelter, St. Louis.....	5.65	5.65	5.75	7.50
Spelter, New York.....	5.80	5.80	5.90	7.65
Lead, St. Louis.....	*4.60*	4.62½	4.67½	4.95
Lead, New York	4.75	4.75	4.75	5.10
Tin, New York.....	*41.85*	42.60	42.60	50.10
Antimony, Hallett, New York..	7.75	7.75	7.75	8.87½
Tin plate, 100-lb. box, Pittsburgh	$3.50	$3.50	$3.50	$3.60

Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.40c. to 1.45c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras.	Cents per lb.
Gauges under ¼ in. to and including 3-16 in.....	.10
Gauges under 3-16 in. to and including No. 8.....	.15
Gauges under No. 8 to and including No. 9.....	.25
Gauges under No. 9 to and including No. 10.....	.30
Gauges under No. 10 to and including No. 12.....	.40
Sketches (including straight taper plates) 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel.....	.40
Locomotive fire box steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.40c. to 1.45c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in. on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, hand rail, car-truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft., to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft., to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Rods and Wire.—Bessemer, open-hearth and chain rods, $27. Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.45; galvanized, $1.85. Galvanized barb wire, to jobbers, $2.05; painted, $1.65. Wire nails, to jobbers, $1.65.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12 & 12½	13	14	15	16
Annealed ...	$1.65	$1.70	$1.75	$1.80	$1.90	$2.00	$2.10	$2.20
Galvanized ...	2.10	2.10	2.15	2.20	2.30	2.40	2.80	2.90

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe (full weight), in effect from August 8, 1913, and iron pipe (full weight), from June 2, 1913:

Butt Weld.

Steel. Inches.	Black.	Galv.	Iron. Inches.	Black.	Galv.
⅛, ¼ and ⅜.....	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld.

2	76	67½	1¼	56	45
2½ to 6.....	78	69½	1½	67	56
7 to 12	75	64½	2	68	58
13 to 15	52	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted.

1 to 3, butt.....	78	69½	1 to 1½, butt.....	70	59
2, lap	74	65½	2, butt	70	59
2½ to 6, lap.....	76	67½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap.....	68	59

Butt Weld, extra strong, plain ends.

⅛, ¼ and ⅜.....	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	75	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends.

2	73	64½	1½	65	59
2½ to 4	75	66½	2	66	58
4½ to 6	74	65½	2½ to 4	70	61
7 to 8	67	56½	4½ to 6	69	60
9 to 12	62	51½	7 and 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends.

½	63	56½	½	57	49
¾ to 1½.....	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends.

2	63	56½	2	55	49
2½ to 4	65	58½	2½ to 4	60	54
4½ to 6	64	57½	4½ to 6	59	53
7 to 8	57	46½	7 to 8	52	42

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads on lap-welded steel, in effect from May 29, 1913, and standard charcoal-iron boiler tubes, in effect from January 1, 1913, are as follows:

Lap-Welded Steel.		*Standard Charcoal Iron.*	
1¾ and 2 in.....	60	1½ in.	44
2¼ in.	57	1¾ and 2 in.....	48
2½ and 2¾ in.....	63	2¼ in.	44
3 and 3¼ in.....	67	2½ to 2¾ in.....	53
3½ to 4½ in.....	69	3 and 3¼ in.....	55
5 and 6 in.....	63	3½ to 4½ in.....	58
7 to 13 in.....	60	Locomotive and steamship special grades bring higher prices.	

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft. and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets.

	Cents per lb.
Nos. 3 to 8	1.55 to 1.60
Nos. 9 and 10	1.60 to 1.65
Nos. 11 and 12	1.65 to 1.70
Nos. 13 and 14	1.70 to 1.75
Nos. 15 and 16	1.80 to 1.85

Box Annealed Sheets, Cold Rolled.

Nos. 10 and 11.....	1.75 to 1.85
No. 12	1.75 to 1.85
Nos. 13 and 14	1.80 to 1.90
Nos. 15 and 16	1.85 to 1.95
Nos. 17 to 21	1.90 to 2.00
Nos. 22 and 24	1.95 to 2.05
Nos. 25 and 26	2.00 to 2.10
No. 27	2.05 to 2.15
No. 28	2.10 to 2.20
No. 29	2.15 to 2.25
No. 30	2.25 to 2.35

Galvanized Sheets of Black Sheet Gauge.

Nos. 10 and 11	2.10 to 2.20
No. 12	2.20 to 2.30
Nos. 13 and 14	2.20 to 2.30
Nos. 15 and 16	2.35 to 2.45
Nos. 17 to 21	2.50 to 2.60
Nos. 22 and 24	2.65 to 2.75
Nos. 25 and 26	2.80 to 2.90
No. 27	2.95 to 3.05
No. 28	3.10 to 3.20
No. 29	3.25 to 3.35
No. 30	3.40 to 3.50

Pittsburgh

PITTSBURGH, PA., September 24, 1913.

Not enough new business is being placed in semi-finished or finished steel to test prices. At the same time it is remarkable how well prices have held up with light buying. Railroads still show no signs of coming in the market for the cars and track material they so badly need, and the naming of lower steel-car prices by the builders has not resulted in bringing out new orders of moment. Consumers buy merely from hand to mouth. Prices have shown no material change in the past week. The pig-iron market is almost bare of inquiry, and several local furnaces have gone out to make needed repairs, taking advantage of the dullness. New inquiry for billets and sheet bars is light, and consumers are not taking in steel as freely as they did some time ago. Prices on steel bars and structural material are fairly strong, but on plates, sheets and most other finished materials are weak. It is the belief that quiet conditions will continue for some time, with the probability that prices on nearly all lines will seek a lower level. Consumers who still have contracts based on prices lower than are ruling now are specifying at a fair rate, but when these contracts have been filled they will be cautious in making new engagements. The markets on scrap and coke are dull, with prices holding about steady.

Pig Iron.—New inquiry is not heavy. The Allegheny Steel Company, which has been in the market for 3000 tons of basic for about two weeks, has not yet closed. It is possible that a trade will be made with a Valley interest, giving ingot molds in exchange for iron. Several small lots of standard Bessemer iron have sold at $15.75, Valley furnace, and a sale of 200 tons of malleable Bessemer iron is reported at $14.50, Valley furnace, this price being higher than has been paid for some time. Mattie furnace at Girard and Rebecca furnace at Kittanning have gone out of blast for relining and repairs. We quote: Bessemer, $15.75; basic, $14; No. 2 foundry, $14 to $14.25; malleable Bessemer, $14.25 to $14.50, and gray forge, $13.35 to $13.50, all at Valley furnace, the freight rate for delivery in the Pittsburgh or Cleveland district being 90c. a ton.

Billets and Sheet Bars.—Only an occasional sale of 100 to 200 tons of billets or sheet bars is being made and for prompt delivery. Consumers are covered by contracts and are getting deliveries from the mills faster than the steel can be used. In fact shipments are being held up, as some of the sheet and tin plate mills are not running to over 50 per cent. of capacity. The leading steel mills are trying to get a differential on Bessemer billets and sheet bars over open hearth, but this is not being done in all cases. We quote open-hearth billets for prompt delivery and for shipment over the remainder of the year at about $24, and sheet bars at $25, maker's mill, in the Pittsburgh or Youngstown districts. About 50c. a ton over these prices is asked for Bessemer, but in only a few cases is it obtained. We quote forging billets at $30 to $31, and axle billets $26 to $27, maker's mill.

Steel Rails.—As yet nothing has been done by the railroads on their rail requirements for 1914, but advices are that some of the leading roads will soon have their estimates ready for the mills to figure on. Small lots of standard sections are being placed, which aggregate a fair tonnage. The new demand for light rails is active, the coal-mining companies being steady buyers, but the competition from the rerolling rail mills is more severe and they are cutting prices of rails rolled from billets about $2 a ton. The Carnegie Steel Company received new orders and specifications last week for upward of 3000 tons of light rails. We quote splice bars at 1.50c. per lb., and standard section rails at 1.25c. per lb. Light rails are quoted as follows: 25, 30, 35, 40 and 45 lb. sections, 1.25c.; 16 and 20 lb., 1.30c.; 12 and 14 lb., 1.35c., and 8 and 10 lb., 1.40c., all in carload lots, f.o.b. Pittsburgh.

Plates.—C. H. Fath & Co., Cleveland, Ohio, are apparently the low bidders on the Lincoln memorial to be built at Washington, D. C., but the contract has not been placed, and the statement that the Carnegie Steel Company had been awarded 3000 tons of piling for this work is incorrect. Active inquiries are out for about 2900 tons of plates for the Los Angeles aqueduct on which Pittsburgh mills are figuring. New inquiries and orders for steel cars are light. The Great Northern is reported to have placed 135 passenger and postal cars with Western makers. The new demand for plates is quiet, and specifications are only fair. We quote ¼ in. and heavier tank plate at 1.40c. to 1.45c., but on desirable specifications the lower price has been shaded by some mills.

Structural Material.—A good deal of work is in sight, and inquiries are active. The McClintic-Marshall Construction Company has taken 1000 tons for a bridge over the Gunpowder River in Baltimore; Fort Pitt Bridge Works, 1700 tons for bridge work for the New York Central; Jones & Laughlin Steel Company, 1500 tons for new steel buildings for the Anaconda Copper Company in Anaconda, Mont., and American Bridge Company, 600 tons for a Western theatre building and about 2200 tons of Western bridge work. The city of Huntington, W. Va., is in the market for 400 to 500 tons for a new city hall building. It is stated that low prices are still being made on new work coming out, and it is claimed these are predicated on the expectation of lower prices ruling in the near future for plain material. We quote beams and channels up to 15-in. at 1.40c. to 1.45c. f.o.b. Pittsburgh.

Wire Rods.—There is a fairly active demand for small lots of Bessemer and open-hearth rods, which are bringing about $27.50 Pittsburgh, but $27 is being named on good orders. We quote Bessemer, open-hearth and chain rods at $27 to $27.50, Pittsburgh.

Ferroalloys.—Inquiries are out for 400 to 500 tons of ferromanganese for October and November delivery, and probably 200 tons have been closed on the basis of $56, Baltimore, and the market seems to be firm at this price. We quote 80 per cent. foreign ferromanganese at $55, Baltimore, the freight rate to the Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $75; over 100 tons to 60 tons, $74; over 600 tons, $73, Pittsburgh. We quote 10 per cent. ferrosilicon at $22; 11 per cent., $23, and 12 per cent. $24, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnaces.

Skelp.—The new demand is good, and the mills are filled up for some time ahead. Prices are firm. Iron skelp is getting scarce on account for four or five puddling plants having been closed down since July 1. We quote grooved steel skelp at 1.35c. to 1.40c.; sheared steel skelp, 1.40c. to 1.45c.; grooved iron skelp, 1.60c. to 1.65c., and sheared iron skelp, 1.65c. to 1.70c., delivered to buyers' mills in Pittsburgh district

Iron and Steel Bars.—Reports of serious cutting in prices of steel bars are strongly denied by the leading makers, who state that they are so well supplied with work that they do not need to book much additional business for this year's delivery. Most of this business is at 1.40c. Some contracts at lower prices have been extended instead of being canceled by the mills, but this has been done in only a few cases. The steel car companies are specifying freely on their contracts for steel bars, and the demand for steel bars for reinforcing purposes is heavy. The tone of the local market in iron bars is a little stronger. This is due to the fact that four or five of the leading puddling mills have been closed since July 1, and muck bar is getting very scarce. We quote steel bars for forward delivery at 1.40c. and for shipment from warehouse in small lots at 1.90c. We quote iron bars at 1.55c. to 1.65c. The mills charge $1 extra per ton for twisting ¾-in. and larger steel bars and $2 extra for ½ to ⅝ in. In some cases, however, these extras are being shaded.

Sheets.—Conditions in the sheet trade are about the same as noted for several weeks. Consumers are holding back placing contracts, not being satisfied that prices are as low as they will go; when they are compelled to buy to replenish stocks they place orders only for small lots. The spread in prices on both black and galvanized sheets named by the different mills is larger than for some time. A few mills are quoting as low as 2.10c. on No. 28 Bessemer black sheets, while others are asking as high as 2.25c., and in some cases are getting this price. Galvanized sheets are ruling from 3.15c. up to 3.30c., but the amount of new business being placed at the higher figure is small. Nearly all the sheet mills are cutting down operations, as the new demand is not large enough to permit them to run full. Some makers express the opinion that prices are probably as low as they will go, and they are refusing to sell into next year at present quotations. We quote Nos. 9 and 10 blue annealed sheets at 1.60c. to 1.65c.; No. 28 Bessemer black, 2.15c. to 2.25c.; No. 28 galvanized, 3.20c. to 3.30c.; No. 28 tin mill black plate, 2.15c. to 2.20c., and No. 30, 2.20c. to 2.25c. These prices are f.o.b. Pittsburgh, in carload and larger lots, jobbers charging the usual advances for small lots from store.

Tin Plate.—There is practically no new business being placed in tin plate, as it is now between seasons, and nothing has been done so far in the matter of con-

tracts for winter and spring delivery. Operations among the tin plate mills are being cut down, specifications in the past couple of weeks having shown a material falling off. We quote nominally at $3.50 to $3.60 for 100-lb. cokes and $3.35 to $3.45 for 100-lb. ternes, f.o.b. mills, Pittsburgh.

Spikes.—Makers report that the new demand for small lots is slightly better, but none of the railroads is in the market at present with large orders, and specifications are quiet. We quote railroad spikes in base sizes, 5½ x 9/16 in., at $1.65 to $1.70, and small railroad and boat spikes in carload and larger lots at $1.75 to $1.80 per 100 lb., f.o.b. Pittsburgh.

Bolts and Rivets.—Prices on nuts and bolts are reported firm, and the new demand is better, but still mostly for small lots to cover current needs. Jobbers and consumers are not anticipating requirements. The new demand for rivets is fairy active, but new buying is only to cover actual wants. We quote button-head structural rivets at $1.90 in large lots and $2 in small lots, and cone-head boiler rivets at $2 in large lots and $2.10 in small lots, terms 30 days net, less 2 per cent. for cash in 10 days. Regular discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 10% off
Small carriage bolts, cut threads	75 and 5% off
Small carriage bolts, rolled threads	75 and 10% off
Large carriage bolts	70 and 2% off
Small machine bolts, cut threads	75 and 10% off
Small machine bolts, rolled threads	75, 10 and 5% off
Large machine bolts	70 and 7½% off
Machine bolts with C.P.C. and T nuts, small	75 and 5% off
Machine bolts with C.P.C. and T nuts, large	70% off
Square hot pressed nuts, blanked and tapped	$5.70 off list
Hexagon nuts	$6.30 off list
C.P.C. and R. square nuts, tapped and blank	$5.70 off list
Hexagon nuts, ⅝ and larger	$6.60 off list
Hexagon nuts smaller than 9/16	$7.20 off list
C.P. plain square nuts	$5.20 off list
C.P. plain hexagon nuts	$5.50 off list
Semi-finished hexagon nuts, ⅝ and larger	85% off
Semi-finished hex. nuts smaller than 9/16	85 and 10% off
Rivets, 7/16 x 6½, smaller and shorter	75, 10 and 10% off
Rivets, metallic tinned, bulk	3½c. per lb. net extra
Rivets, tin plated, bulk	1½c. per lb. net extra
Rivets, metallic tinned, packages	70, 10 and 10% off
Standard cap screws	75, 10, 10 and 7½% off
Standard set screws	75, 10, 10 and 7½% off

Shafting.—The new demand continues dull, and only for small lots to cover actual needs. The automobile trade and other large consumers placed contracts some time ago, but so far specifications against this business have been light. None of the shafting makers is operating full, and there will likely be a further slowing down in the near future unless the demand soon shows betterment. We continue to quote cold-rolled shafting at 60 per cent. off in carloads and 55 per cent. in small lots delivered in base territory, but on any desirable business 62 per cent. off is being named.

Hoops and Bands.—New orders are light, and only for small lots. Large consumers, such as the cooperage plants and others, covered ahead some time ago, and specifications against these contracts are coming in at a fair rate. We quote steel hoops in small lots at 1.60c. and bands at 1.40c., with extras on the latter as per the steel bar card. On a desirable order the quotation on hoops would likely be shaded.

Wire Products.—The market is firmer than for some time. The new demand is quiet, as most jobbers and consumers placed contracts in August covering their requirements for some time ahead, and good specifications against these contracts are coming in. We quote: Wire nails to jobbers, $1.65; cut nails, $1.60; plain annealed wire, $1.45; galvanized barb wire, $2.05, and painted barb wire, $1.65, f.o.b. Pittsburgh, per 100 lb., usual terms, actual freight added to point of delivery.

Merchant Steel.—New business being received by the mills is mostly in small lots to cover current needs, and specifications against contracts are only fair. Makers have pretty well caught up on back orders, and consumers have no trouble in getting prompt deliveries. Prices, which are being more or less shaded, depending on the order, are as follows: Iron finished tire, 1½ x ½ in., and larger, 1.40c., base; under 1½ x ½ in., 1.55c.; planished tire, 1.60c.; channel tire, ¾ to ⅞ and 1 in., 1.90c. to 2c.; 1⅛ in. and larger, 2c.; toe calk, 2c. to 2.10c., base; flat sleigh shoe, 1.75c.; concave and convex, 1.80c.; cutter shoe, tapered or bent, 2.30c. to 2.40c.; spring steel, 2c. to 2.10c.; machinery steel, smooth finish, 1.85c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.30c.; soft, 3.55c.; coils, hard, 3.20c.; soft, 3.45c.; freight allowed. The usual differentials apply for lighter gauges and sizes.

Coke.—Deals are under way involving some large tonnages, one inquiry being for 10,000 tons a month for October, November and December, and two others for 5000 tons each for October delivery. Some makers that have been holding firmly at $2.50 per net ton at oven insist that the coke that is being sold at $2.25 and less is not standard coke. On the other hand, several coke dealers are offering coke as low as $2.15 per net ton at oven, and will guarantee sulphur not to exceed 1 per cent., ash 12 per cent. and phosphorus 0.020 per cent., this being the standard analysis for coke for making Bessemer iron. It is probable that within the next three or four days some of the coke now under negotiation will be closed up, but furnaces still insist that they can buy all the coke they want at $2.25 and less, so that the probability of securing $2.50 seems remote. It is said that a good deal of coke is being stocked at ovens. There is not much inquiry for foundry coke, most consumers being covered. We quote standard makes of furnace coke for delivery over the remainder of the year at $2.15 to $2.25, but note that several large makers are firm at $2.50 per net ton at oven. We quote best grades of 72-hr. foundry coke at $2.90 to $3 per net ton at oven.

Standard Pipe.—The new demand for lap-weld pipe continues active, but there are no definite inquiries out for line pipe, although three or four projects are under way that will require a heavy tonnage if they go through. The pipe mills are pretty well filled with orders over the remainder of the year with the exception of butt weld, the demand for which has been light for a long time. Discounts on iron and steel pipe are fairly well maintained.

Boiler Tubes.—New business placed for some time has been light, and as some of the mills have pretty well caught up on back orders they are going after new business more aggressively and discounts on steel boiler tubes are being more or less shaded. It is stated that prices on iron tubes are being fairly well maintained.

Old Material.—Several large consumers of heavy melting steel scrap are showing some interest in the market. One of them is reported as having bought 6000 to 8000 tons of selected at about $12.75 delivered at a point east of Pittsburgh, and another 5000 to 6000 tons at $12.75, delivered at a point in the Pittsburgh district. Another local consumer has picked up 800 to 1000 tons of selected in the past week for which it paid $13, delivered. A feature of the scrap market is the scarcity of borings, for which there is more inquiry and a lighter supply than any of the other grades. A local scrap dealer reports sales of 700 to 800 tons of borings at close to $8.50, delivered. As the season when winter weather may be looked for is close at hand, dealers are hopeful that consumers will soon commence to stock up on scrap, and this may soon lead to an increased demand. We note sales of upward of 1000 tons of turnings at about $7.35 per gross ton, delivered at Johnstown, Pa. Prices are unchanged, with the exception of borings, which are 25c. higher. Dealers quote as follows, per gross ton, for delivery in the Pittsburgh district:

Selected heavy steel scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.75 to	$13.00
Ordinary steel scrap	12.25 to	12.50
Compressed side and end sheet scrap		10.50
No. 1 foundry cast	12.75 to	13.00
No. 2 foundry cast	11.50 to	11.75
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.00 to	8.25
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	14.50 to	14.75
No. 1 railroad malleable stock	11.50 to	11.75
Grate bars	8.25 to	8.50
Low phosphorus melting stock	15.75 to	16.00
Iron car axles	24.50 to	25.00
Steel car axles	17.50 to	17.75
Locomotive axles, steel	21.00 to	21.50
Locomotive axles, iron	25.50 to	26.00
No. 1 busheling scrap	12.00 to	12.25
No. 2 busheling scrap	7.50 to	7.75
*Machine shop turnings	7.25 to	7.50
Old carwheels	13.75 to	14.00
*Cast-iron borings	8.25 to	8.50
†Sheet bar crop ends	14.00 to	14.25
Old iron rails	14.50 to	14.75
No. 1 railroad wrought scrap	13.75 to	14.00
Heavy steel axle turnings	9.00 to	9.25
Stove plate	8.25 to	8.50

*These prices are f.o.b. cars at consumers' mills in the Pittsburgh district.

†Shipping point.

Chicago

CHICAGO, ILL., September 24, 1913.—(*By Telegraph.*)

An increased number of orders for a larger aggregate tonage is reported generally by makers of finished steeel products. This improvement has brightened the tone of the market and is traceable to agricultural implement bar specifications, continued buying of wire and wire products, renewed buying of structural shapes by fabricators and scattering purchases of cars. One Western road has quietly placed car orders for which local mills will supply about 35,000 tons of steel. For this business it was undoubtedly necessary to quote satisfactory prices, but the run of orders taken has resulted from aggressive canvassing rather than marked concessions. Current rail purchases are confined to unimportant lots, but programmes for contracting are being made up for early action. The buying of pig iron is scattered, the largest sale noted being for 2000 tons. A considerable portion of the iron now being placed is for delivery in 1914, Southern furnaces making a price of $11.50.

(*By Mail*)

Pig Iron.—Sales of the past week have been for the most part in lots of less than 1000 tons. Buyers of foundry and basic iron for delivery from local furnaces for the remainder of the year have been unable to do better than $15 at the furnace, and the furnaces on the other hand have found it impossible to secure an advance above that figure. A number of sales of Southern foundry iron are noted, contracts for this year being placed at $11.25, Birmingham, while a number of orders running into 1914 were placed on the basis of $11.50. One lot of 2000 tons was sold for delivery in the first half at $11.50 and there seems to be more of a willingness on the part of the furnaces to book next year's business. Some charcoal iron was sold during the week, but without any apparent improvement in prices. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 1, 2, 3, 4	$14.75 to $15.25
Northern coke foundry, No. 1	15.50 to 16.00
Northern coke foundry, No. 2	15.00 to 15.50
Northern coke foundry, No. 3	14.50 to 15.00
Southern coke, No. 1 foundry and No. 1 soft	15.85 to 16.35
Southern coke, No. 2 foundry and No. 2 soft	15.35 to 15.85
Southern coke, No. 3	14.85 to 15.35
Southern coke, No. 4	14.35 to 14.85
Southern gray forge	14.35 to 14.85
Southern mottled	14.10 to 14.60
Malleable Bessemer	15.00 to 15.50
Standard Bessemer	18.40
Basic	15.00 to 15.50
Jackson Co. and Kentucky silvery, 6 per cent.	18.40
Jackson Co. and Kentucky silvery, 8 per cent.	19.40
Jackson Co. and Kentucky silvery, 10 per cent.	20.40

Cast-Iron Pipe.—Additional municipal lettings failed to materialize the past week, prospects for tonnage being confined to 200 tons for Kansas City and 300 tons for Detroit. Some of the gas companies are figuring on their requirements and inquiries from this source are expected in the near future. We quote as follows, per net ton, Chicago: Water pipe, 4-in., $28; 6 to 12 in., $26; 16-in. and up, $25, with $1 extra for gas pipe.

(*By Mail*)

Rails and Track Supplies.—Purchases of rails reported in this market the past week included a number of small lots, the largest of which was for 4000 tons for a Pacific coast railroad. One of the northwestern roads, closely allied with a Canadian trunk line, has been buying track supplies in substantial quantities, which buying is considered to be but a forerunner of a general contracting by other systems. We quote standard railroad spikes at 1.70c. to 1.75c., base; track bolts with square nuts, 2.25c., base, all in carload lots, Chicago; tie plates, $30 to $32, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—A decidedly encouraging increase in orders for structural steel from fabricating shops is noted in the business taken by local mills. A canvass of the situation indicates that fabricating interests are finding their business at practically a normal level. Nor have larger tonnages been lacking among the bookings of the week, liberal orders for car steel having been developed from the buying of a round number of cars by one of the railroads which has been quietly covering a variety of requirements. The American Bridge Company will furnish 610 tons for the Orpheum Theater at Kansas City and will, it is understood, fabricate about 2000 tons for buildings at the Puget Sound Navy Yard. The Baker Iron Works took the contract for 400 tons for the Pacific Telephone & Telegraph Company at Los Angeles. The Washington Water Power Company has placed 210 tons of steel for head gates at Springdale, Wash. For the general run of structural steel orders there appear to be no departures from regular contract prices as indicated by our quotations, but for steel applying on car orders substantial concessions have undoubtedly been made. For Chicago delivery from mill we quote 1.63c.

Notwithstanding the general slowing up that the mills have been experiencing as regards incoming structural orders, the demand from store has failed to show as yet a parallel decrease. It is probably true that some buyers are tiding over their immediate requirements by purchases from jobbers' stocks in small quantities in preference to lending support to the mills. From store we quote for Chicago delivery 1.95c.

Plates.—A scattering demand for tank plates has brought a fair tonnage into this market recently, but a number of mills could easily handle more than is being offered. Where buyers can take material on deliveries that fit advantageously into the mill schedules, no difficulty is experienced in securing quotations based on 1.40c., Pittsburgh. Sales are also reported at full prices. We quote for Chicago delivery from mill 1.58c. to 1.63c.

Plate sales out of store are comparatively light. We quote for Chicago delivery, 1.95c.

Sheets.—The past week has shown an improvement in sheet tonnage, but this has not been paralelled by any return of strength in prices. On ordinary business 2.33c. for No. 28 box annealed and 3.33c. for No. 28 galvanized can be done at Chicago, while especially desirable business would hardly be lost for lack of a concession of $1 a ton from those prices. Softness is also apparent in quotations on blue annealed sheets. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.78c.; No. 28 black, $2.33c.; No. 28 galvanized, 3.33c.

We quote for Chicago delivery from store, No. 10 blue annealed, 2.15c.; No. 28 black, 2.75c.; No. 28 galvanized, 4c.

Bars.—The price at which bar iron may be secured is in large measure a question of the delivery required and the mill situation as regards its need of tonnage to fill out rolling schedues. Quotations varying from 1.32½c. to 1.40c. have been made and business placed during the past week. In its lack of strength the bar iron market reflects the fact that mill rollings are close on the heels of their orders. Steel bar specifications are being received in quantity well up to normal, and prices appear to be undisturbed. Prices for hard steel bars have been fairly well maintained, occasional concessions not exceeding $1 a ton. We quote for mill shipment as follows: Bar iron, 1.35c. to 1.37½c.; soft steel bars, 1.58c.; hard steel bars, 1.50c.; shafting in carloads, 60 per cent. off; less than carloads, 55 per cent. off.

For delivery from store we quote soft steel bars, 1.85c.; bar iron, 1.85.; reinforcing bars, 1.85c. base, with 5c. extra for twisting in sizes ½ in. and over, and usual card extras for smaller sizes; shafting 55 per cent. off.

Rivets and Bolts.—New business in rivets in this market seem to have so dwindled as to discourage Eastern makers from canvassing the situation. Prices are soft and quotations irregular. Specifications for bolts against contracts are fair but open orders are of no great consequence. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 75-10-7½; cut thread, 75-12½; larger sizes, 70-12½; machine bolts up to ⅜ x 4 in., rolled thread, 75-10-12½; cut thread, 75-10-7½; large size, 70-10-5; coach screws, 80-12½-5; hot pressed nuts, square head, $6 off per cwt.; hexagon, $6.70 off per cwt. Structural rivets, ¾ to 1¼ in., 1.98c. to 2.03c., base, Chicago, in carload lots; boiler rivets, $.10c. additional.

Out of store we quote for structural rivets, 2.70c., and for boiler rivets, 2.90c. Machine bolts up to ¾ x 4 in., 70-5-10; larger sizes, 70-7½; carriage bolts up to ⅜ x 6 in., 75-5; larger sizes, 70-7½ off. Hot pressed nuts, square head, $5.50, and hexagon, $6.20 off per cwt.

Wire Products.—The substantial aspects of the trade in wire and wire nails are being enhanced by a continuance of activity. In large measure the increased bookings of steel by those mills which are makers of wire products is traceable to recent orders for wire products. Prices are firmly established. Prices to jobbers are as follows: Plain wire, No. 9 and coarser, base, $1.63; wire nails, $1.83; painted barb wire, $1.83; galvanized, $2.20; polished staples, $1.83; galvanized, $2.15, all Chicago.

Old Material.—Local consumers of scrap are taking in from day to day quantities of old material just about equivalent to the tonnage that the dealers find it neces-

sary to move. Nearly all sales are accordingly made under some pressure, and prices continue to suffer in consequence. We note reductions of at least 25c. per ton on most grades of material. No. 1 railroad wrought has been sold in a lot of 1000 tons at $10 Chicago, with a 20c. freight to be added to delivery point, and No. 2 has sold at $9.25 delivered in quantity. Old carwheels in small quantities have sold as low as $12.25, while other lots have gone begging at $12.50. The outlook is for a continued downward trend in view of the heavy railroad tonnage which this market will be required to absorb this week. Current lists include 3600 tons from the Great Northern, 6000 tons from the Illinois Central, 2000 tons from the Chicago, Milwaukee & St. Paul and 3000 tons from the Chicago, Burlington & Quincy, making a total of about 15,000 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton.

Old iron rails	$14.00 to $14.50
Old steel rails, rerolling	12.25 to 12.75
Old steel rails, less than 3 ft.	11.25 to 11.75
Relaying rails, standard section, subject to inspection	24.00
Old carwheels	12.25 to 12.75
Heavy melting steel scrap	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.75 to 10.25
Steel axle turnings	7.25 to 7.75

Per Net Ton.

Iron angles and splice bars	$13.25 to $13.75
Iron arch bars and transoms	13.50 to 14.00
Steel angle bars	9.50 to 10.00
Iron car axles	20.25 to 20.75
Steel car axles	15.25 to 15.75
No. 1 railroad wrought	10.00 to 10.25
No. 2 railroad wrought	9.25 to 9.50
Cut forge	9.25 to 9.50
Steel knuckles and couplers	9.75 to 10.25
Steel springs	10.00 to 10.50
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	4.90 to 5.15
Cast and mixed borings	4.50 to 5.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.50 to 7.00
No. 1 boilers, cut to sheets and rings	7.25 to 7.75
Boiler punchings	10.50 to 11.00
No. 1 cast scrap	10.50 to 11.00
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 7.75

Philadelphia

PHILADELPHIA, PA., September 23, 1913.

Somewhat of a lull has developed in the pig-iron markets, particularly in foundry grades, yet prices continue to harden. A round lot of basic iron was sold for first quarter delivery at an advance of about 50c. a ton. A number of producers are well sold up for this year and name relatively higher prices and show little disposition to trade for forward delivery. The demand for finished materials is inclined to be more irregular. Orders have been smaller and inside quotations are being more generally named for current business. In some lines further concessions for tonnage orders are believed possible. The volume of business in structural shapes is lighter, although several sizable building propositions are in sight. Billets have been in a trifle better demand, but prices remain weak. Prompt furnace coke is lower, standard brands being offered down to $2.20 oven. The old material market shows practically no change; in the principal grades the deadlock between buyers and sellers is still on.

Iron Ore.—Most consumers are fully covered for this year's needs and show no interest in the market. Importations at this port during the week ended September 20 included 5400 tons from Venezuela and 4850 tons from Cuba.

Pig Iron.—Consumers of the higher foundry grades having covered largely for their general near future requirements, a lull is now experienced. The most recent important purchases have been by the Pennsylvania Railroad against its inquiry for 4750 to 9400 tons, including coke and charcoal iron, for fourth quarter delivery at Altoona. Practically all of the coke iron, 3400 to 6800 tons, was placed with producers in central Pennsylvania, the charcoal iron being divided between Southern and Lake Superior furnaces. The general run of small lot business in No. 2 X and No. 2 plain foundry iron has been lighter. Prices, however, continue to strengthen. Eastern Pennsylvania furnaces quote a rather wide range for delivery over the remainder of the year, depending largely on the condition of order books. The minimum for standard brands of No. 2 X is now close to $16, delivered, although some makers ask from 50c. to 75c. advance. Several central Pennsylvania furnaces, having favorable freight rates, can at some points do $15.85 for No. 2 X, but have not been important sellers. Few Eastern producers are yet prepared to name general quotations for delivery in 1914. Where requests for prices have been made it is customary to add up to 50c. a ton for first quarter, on current fourth quarter quotations, but the volume of such business has been small. Sellers of Virginia foundry iron have been making smaller general sales. In instances transactions up to 500 tons have been made at $13 at furnace for No. 2 X, although the leading producer adheres to $13.25 for delivery over the remainder of the year. Cast-iron pipe makers in this district are still in the market for considerable low grade iron. One interest which recently inquired for 5000 tons has not yet closed, while another, which would probably take up to 10,000 tons, has been making 500-ton purchases at $15, delivered at Delaware River points. Low grade iron is gradually becoming scarcer. While the movement in rolling mill forge iron has not been so active, small lots are being sold at prices ranging close to $15 delivered, and one lot of 500 tons was sold at $15.40, but in this case a freight rate higher than usual applied. An interesting transaction in basic iron was closed by a central Pennsylvania steel maker, who bought recently for fourth quarter at $15.35 delivered, taking from 5000 to 6000 tons for first quarter delivery at a price in the neighborhood of $15.75, the purchase being made from the same producer. For this year's shipment an inquiry for 3000 tons of basic, from a steel maker in this district, is before the trade, on which quotations rule from $15.25 to $15.50 delivered. Little business is moving in standard analysis low phosphorus pig iron, small lots selling at $23 to $23.50, delivered here. The demand for Lebanon Valley low phosphorus iron is practically at a standstill. Prices for current sales of standard brands, delivered in buyers' yards in this district, for shipment over the remainder of the year, range about as follows, with advances of about 50c. a ton named for first quarter or half of 1914 delivery:

Eastern Pennsylvania No. 2 X foundry	$16.00 to $16.25
Eastern Pennsylvania No. 2 plain	15.75 to 16.00
Virginia No. 2 X foundry	15.80 to 16.25
Virginia No. 2 plain	15.75 to 16.00
Gray forge	15.00 to 15.25
Basic	15.25 to 15.50
Standard low phosphorus	23.00 to 23.50

Ferroalloys.—Sales of small lots of 80 per cent. ferromanganese at $56, seaboard, have been more numerous. Price concessions are less available, due in a measure to irregular shipments caused by labor troubles at the docks abroad. No business in forward ferromanganese is moving. Importations of ferromanganese at this port last week were only 100 tons.

Billets.—The demand, while irregular, has been a trifle better, there having been more movement in small lots. Several fair-sized inquiries recently before the trade are still unclosed. Mill operations continue at about 75 per cent. of capacity. The final decision as to the new duty on imported billets evidently has some bearing on buying. Prices are irregular, small lots of ordinary basic open-hearth rolling billets have been sold at $25.75, delivered, but on sizable orders $25, delivered, could no doubt be done. Forging billets of ordinary analysis specifications are quoted at $30 to $31, mill, according to specifications.

Plates.—Some mills continue to receive a very satisfactory volume of business. Orders are practically all small and of a miscellaneous character covering moderate requirements in boiler, bridge, tank and locomotive plates. In many cases acceptances are subject to the ability of mills to make prompt deliveries, indicating that buyers are purchasing material only as needed. Little actual business has been placed by shipbuilders. Bids are now being asked for plates for three vessels for the Clyde Line, requiring about 3000 tons. Prices still show irregularity. On small spot lots some mills obtain 1.60c., delivered, but on business on which there is any competition 1.40c., delivered, more generally rules.

Structural Material.—The volume of miscellaneous business coming to Eastern mills has been smaller. Practically all of the plain shape business recently taken has been confined to small lots. Mills are becoming more anxious for orders, and in the majority of cases 1.55c., delivered, is quoted if the business be at all attractive. Large propositions in this immediate vicinity

are few. Interest is shown in some proposed terminal betterments by the Lehigh Valley Railroad, and a hotel building requiring 2000 tons is talked of. About 300 tons will be needed for a new theatre in West Philadelphia. The McClintic-Marshall Construction Company has the contract for the No. 2 Gunpowder highway bridge for the city of Baltimore, requiring about 1000 tons. Prices of plain shapes range from 1.55c. to 1.60c., delivered here.

Sheets.—A fair volume of business comes out, mostly for small lots, and Eastern mills are taking numerous day-to-day orders, equal in the aggregate to about mill capacity. Prices continue irregular, Western No. 10 blue annealed sheets being quoted at 1.75c. to 1.80c. here, while Eastern mills, making smooth loose-rolled sheets, usually quote 1.80c. for reasonable prompt deliveries.

Bars.—The demand for iron bars has not been very active, and some of the smaller mills having but a limited capacity are quoting 1.25c. mill for current business. Other mills adhere firmly to a 1.30c. minimum and in instances obtain up to 1.35c. at mill. The full range of the market for common iron bars is from 1.32½c. to 1.42½c. delivered here. Steel bars are not active, but ordinary business is done at 1.55c. delivered.

Coke.—Offerings of spot and near future furnace coke have been more plentiful. Sales of standard coke have been made for October shipment at $2.25 at oven and prompt coke has been offered down to $2.20. High ash but standard sulphur coke is to be had at $2 at oven. A moderate movement in foundry coke continues at prices ranging from $3 to $3.15 at oven. The following range of prices, per net ton, is named for delivery in buyer's yards in this vicinity:

Connellsville furnace coke	$4.25 to $4.65
Connellsville foundry coke	4.90 to 5.35
Mountain furnace coke	4.00 to 4.25
Mountain foundry coke	4.50 to 4.75

Old Material.—The demand continues irregular. In many grades consumers offer inside quotations with sellers holding at the outside figures; both are firm and therefore little business is being done. One Eastern steel maker bought several 1000-ton lots of No. 1 heavy melting steel at $12, delivered, although odd lots are still occasionally available at $11.75. Some specialties, such as rerolling rails and old steel axles, have been in better demand, with small lot sales at higher prices. Machinery cast has been in better demand, but rolling mill grades as well as borings and turnings have been quiet. Quotations are still to a certain extent nominal. An approximate range for delivery in buyers' yards in this district, covering eastern Pennsylvania, taking freight rates varying from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$11.75 to $12.00
Old steel rails, rerolling (nominal)	14.50 to 15.00
Low phosphorus heavy melting steel scrap (nominal)	16.00
Old steel axles	18.50 to 19.00
Old iron axles (nominal)	25.00
Old iron rails	17.50 to 18.00
Old carwheels	13.00 to 13.50
No. 1 railroad wrought	14.75 to 15.25
Wrought-iron pipe	11.25 to 11.50
No. 1 forge fire	10.00 to 10.25
No. 2 light iron (nominal)	6.00
No. 2 busheling (nominal)	8.00 to 8.50
Wrought turnings	8.00 to 8.50
Cast borings	8.25 to 8.50
Machinery cast	13.00 to 13.50
Grate bars, railroad	9.50 to 10.00
Stove plate	9.50 to 10.00
Railroad malleable (nominal)	11.00 to 11.50

Cincinnati

CINCINNATI, OHIO, September 24, 1913.—(*By Telegraph.*)

Pig Iron.—While the Southern market continues to show signs of increasing strength there is yet a considerable tonnage of No. 2 foundry obtainable at $11, Birmingham, for this year's shipment. It is generally conceded that Southern furnaces are shipping out more iron than they are making, and although the margin is rather narrow the simple fact that the general melt is holding up is sufficient to cause a much better forecast for the future. Nearly all the furnaces in the South are quoting $11.50 for this year's shipment, with 50c. advance on first half business. However, the first-named price is being inserted in a number of contracts for first quarter movement. The inquiry is better than last week's record. Two central Indiana melters are expected to close for fair-sized tonnages this week, both wanting first half shipment. The larger calls for 1000 tons each of Northern and Southern foundry iron, while the smaller is for about 500 tons each of Northern and Southern. A local firm is inquiring for 600 tons of Southern foundry for first quarter shipment. Northern foundry iron is rather slow. A few small sales are reported at $14, Ironton, for this year's delivery, and while $14.50 for first half business is the regular quotation this has been shaded in a few instances. Several Michigan consumers have lately made small purchases of both Northern and Southern foundry, and reports from other Chicago territory indicate more activity than in this immediate vicinity. Basic is quiet, although there is yet one large order to be placed by a nearby concern. Malleable is also dull, with no sign of improving soon. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote f.o.b. Cincinnati as follows:

Southern coke, No. 1 foundry and 1 soft	$14.75 to $15.25
Southern coke, No. 2 foundry and 2 soft	14.25 to 14.75
Southern coke, No. 3 foundry	13.75 to 14.25
Southern, No. 4 foundry	13.25 to 13.50
Southern gray forge	12.75 to 13.25
Ohio silvery, 8 per cent. silicon	18.20 to 18.70
Southern Ohio coke, No. 1	16.20 to 16.70
Southern Ohio coke, No. 2	15.20 to 15.70
Southern Ohio coke, No. 3	14.95 to 15.45
Southern Ohio malleable Bessemer	15.20 to 15.45
Basic, Northern	15.20 to 15.45
Lake Superior charcoal	16.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(*By Mail*)

Coke.—Foundry grades probably show a little more strength in all three producing districts. Although it is possible to obtain Connellsville and Pocahontas 72-hr. coke below $3 per net ton at oven, for prompt shipment, this only applies to a few brands. Regular quotations range from $2.90 to $3.25. Contract business is being closed around $3, with shipments extending through the first half of next year in a few cases. There is a much better demand for domestic coke. Furnace coke is very dull, and no immediate large contracts are in sight in this section. While it has been currently reported that Connellsville 48-hr. brands have been selling below $2.50 per net ton at oven, curtailment in production has somewhat stiffened that particular market. Not much business is reported from the Wise County district, and quotations are about on a par with Connellsville prices.

Finished Material.—Local mill agencies, as well as retail dealers, are almost unanimous in reporting rather quiet conditions. Several cite a practically similar condition that existed last year at this time. The usual fall trade is expected to begin before the middle of the coming month. The local warehouse price on steel bars is 1.95c. and on structural material 2.05c. to 2.10c. Railroad track material is showing some improvement.

Old Material.—Conditions are very unsatisfactory, both from a seller's and a foundryman's standpoint. Prices have been reduced on practically all kinds of scrap, and there is nothing to indicate an early change for the better. The minimum prices given below represent what buyers are willing to pay for delivery in their yards, southern Ohio, and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards:

Per Gross Ton.	
Bundled sheet scrap	$7.00 to $7.50
Old iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	11.00 to 11.50
Melting steel rails	9.50 to 10.00
Old carwheels	10.75 to 11.25
Per Net Ton.	
No. 1 railroad wrought	$9.00 to $9.50
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.00
No. 1 cast scrap	9.00 to 9.50
Burnt scrap	6.50 to 7.00
Old iron axles	16.75 to 17.25
Locomotive tires (smooth inside)	10.25 to 10.75
Pipes and flues	6.00 to 6.50
Malleable and steel scrap	7.50 to 8.00
Railroad tank and sheet scrap	4.75 to 5.25

Cleveland

CLEVELAND, OHIO, September 23, 1913.

Iron Ore.—Shippers are well up on their contracts and there has been considerable let-up in the movement this month as compared with the activity during the middle of the summer. Weather conditions are interfering more with the movement than they did during the summer. Boats were delayed considerably the past week by fogs and by a storm on Lake Superior. We quote prices as follows: Old range Bessemer, $4.40; Mesaba Bessemer, $4.15; old range non-Bessemer, $3.60; Mesaba non-Bessemer, $3.40.

Pig Iron.—The market shows little activity. Most foundries have all the iron they will need for the remainder of the year and very few are ready to buy for

delivery until next year, at least at the advance in price of from 25c. to 50c. a ton asked by most of the producers. A Cleveland interest which has been naming low prices in this market has advanced its price 25c. a ton for Cleveland delivery, making the minimum Cleveland price $14.75 delivered for No. 2. The same interest has made a number of sales in the northern Ohio territory for the first quarter delivery at $14.25. There appears to be considerable irregularity in price quotations by Valley furnaces. While some are asking $14.25 and one or two $14.50, plenty of No. 2 iron can still be had from Valley furnaces at $14 for the last quarter delivery. There is practically no inquiry for Southern grades. Leading producers are quoting No. 2 foundry at $11.50 Birmingham for the last quarter and $12 for the first half. However, some Southern for spot shipment can still be had for $11. For prompt shipment and for the last quarter we quote, delivered Cleveland, as follows:

Bessemer	$16.65
Basic	14.90
Northern No. 2 foundry	$14.75 to 15.00
Southern No. 2 foundry	15.35 to 15.85
Gray forge	14.25
Jackson County silvery, 8 per cent. silicon	18.55 to 19.05

Coke.—Standard makes of Connellsville foundry coke are being more freely offered at $2.25 per net ton at oven than a week ago and the buyers are looking for still lower prices. The demand is very dull. Consumers are not disposed to make contracts at the present time. There is little inquiry for foundry grades as foundries are well covered with contracts. We quote Standard Connellsville foundry coke at $3 per net ton at oven for spot shipment and contract.

Old Material.—The scrap market is almost lifeless and prices show further weakness. While quotations generally are unchanged they are largely nominal, and prices on practically all grades are being shaded by dealers who are anxious to make sales. Local steel mills are well supplied, and one plant is not accepting shipments. There is an abundance of scrap on the market. The outlook for any decided improvement in the condition of the scrap trade is less promising than for some time. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton.

Old steel rails, rerolling	$13.00 to $13.50
Old iron rails	14.00
Steel car axles	17.00 to 17.50
Heavy melting steel	11.00 to 11.25
Old carwheels	12.50 to 13.00
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	10.00 to 10.50
Railroad malleable	11.00 to 11.50
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton.

Iron car axles	$20.00 to $21.00
Cast borings	5.75 to 6.00
Iron and steel turnings and drillings	4.50 to 4.75
Steel axle turnings	7.00 to 7.50
No. 1 busheling	10.25 to 10.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 cast	11.00 to 11.50
Stove plate	8.50 to 8.75
Bundled tin scrap	10.00 to 10.50

Finished Iron and Steel.—While the demand is not active an improvement is reported by some of the selling agencies which have been getting a better volume of specifications in the past few days. There is a fairly good demand for structural material in spite of the fact that no new building work requiring round tonnages is in prospect. There is also a fair volume of inquiry for plates. On structural material prices are being generally maintained at 1.45c., Pittsburgh. While some of the larger mills are still asking 1.45c. for plates most of the business is going at 1.40c., and this has been shaded. The price of steel bars is being firmly maintained at 1.40c., Pittsburgh. There are rumors that this price has been shaded, but these appear unfounded. In structural work bids will be received September 25 for an addition to the Taylor store building and for new shop buildings for the Cleveland Railway Company, each taking about 800 tons. There is inquiry from Niles, Ohio, for 1000 tons of sheet bars for prompt shipment. The new demand for sheets is not active and prices continue weak. Black sheets are generally quoted at 2.15c. for No. 28, but sales have been made at 2.10c. or lower. On galvanized sheets 3.15c. appears to be the minimum quotation for No. 28, and 1.60c. for No. 10 blue annealed. Rivet prices are unchanged at 1.90c. for structural and 2c. for boiler rivets, but these prices can be shaded on car lots. The demand for bar iron continues light, with quotations unchanged at 1.40c. to 1.45c. Warehouse business is fairly good. Stock prices are unchanged at 2c. for steel bars and 2.10c. for structural steel.

German Prices Still Giving Way

Reductions Now Becoming Numerous and Export Business Not Satisfactory

BERLIN, September 11, 1913.

The iron trade continues quiet, with the weakening tendency of prices still unchecked. Reductions during the week have been more numerous than usual. First came lower quotations on the Düsseldorf Exchange on Friday for all classes of plates; but its prices do not fully reflect actual market conditions, being generally 2 to 3 marks above manufacturers' prices. Reports sent in by wire on the same day when the Exchange's quotations were issued indicated that heavy plates could be obtained from manufacturers as low as 106 marks ($25.23), which is only 3.50 marks (83c.) higher than the price of the Steel Works Union for slabs. Of course there can be no profit in rolling plates at such prices. The Exchange had been quoting iron bars for months at 145 to 148 marks ($34.51 to $35.22), but it has now changed to 140 to 145 marks ($33.32 to $34.51). As against the last price of 98 to 102 marks ($23.32 to $24.28) quoted on the Düsseldorf Exchange for basic steel bars, the Hoesch Company, of Dortmund, has just issued its list for the last quarter of the year, showing prices ranging between 95 and 97 marks ($22.61 and $23.08). These prices can be regarded as representing actual market conditions, inasmuch as the company named usually sets the pace in the bar trade.

The rebates on gas piping have been increased, equivalent to a reduction of about 15 marks ($3.57) a ton. This is explained as rendered necessary by the prostration in house building. The leading independent manufacturer of screws has just increased rebates 1 to 3 per cent., and the trade combination, it is announced, will also make reductions within a few days.

The state of employment with the various works appears to be quite irregular. The foreign business of iron companies continues for the most part unsatisfactory. The Balkan countries are still holding off and thus disappointing the hopes that had been entertained in connection with the declaration of peace there. The demand from other export markets has latterly improved to some extent, but selling remains sluggish. German manufacturers complain that Belgian and French competition is steadily growing sharper in outside markets.

Pig Iron Slowly Loses Strength

The pig-iron trade is visibly, though slowly, approaching less satisfactory conditions. Stocks at the furnaces are increasing. At the end of August they reached 430,000 tons, which means a gain of 31,000 tons for the month. The August production lagged only a little behind that of July, amounting to 1,638,824 tons, or 8894 tons less.

The Coal Syndicate, at its meeting this afternoon, disappointed expectations by refusing to change its prices. The only concession it made was to depart from its usual practice of fixing prices for an entire half-year, and fixed them instead only till the end of the year. At another meeting, to be held in November or December, it will again take up the price question for dates beyond the end of the year. It now remains a question whether the Pig-Iron Syndicate shall make a reduction of its prices at the meeting to be held before the end of this month. It has been contemplating a reduction, as previously mentioned, but its plan was to make its action dependent upon what the Coal Syndicate did.

The August shipments of the Steel Works Union in semi-finished steel rails and structural shapes were 520,000 tons, a gain of 14,000 tons over July, but 33,000 tons less than in August, 1912. The structural shipments were about 60,000 tons less than in August, 1912.

A meeting of the executive committee of the general association of industries working up or consuming tin plates held recently at Leipzig, discussed the recent deterioration in the quality of German and English tin plates; and at the next meeting of the association itself measures for securing an improvement will be discussed.

The movement of prices in the Belgian market has been somewhat irregular. The home price of basic bars was raised 2.50 francs (48c.) a ton at the end of last week; but bands for export, which had been previously quoted at £6 7s. to £6 10s. ($30.89 to $31.63), were reduced to £6 5s. to £6 10s. ($30.42 to $31.63). Steel rails, which had previously commanded from £5 15s. to £6 ($27.98 to $29.20), are now reported as bringing from £5 12s. ($27.25) up.

A report on the Russian market indicates that busi-

ness continues good, and it is even expected that still greater activity will be noted later, owing to the large demands for naval construction purposes. New railroads are to take large quantities of steel.

Boston

BOSTON, MASS., September 23, 1913.

Old Material.—The market shows little change. The low prices of the past two months continue, and dealers do not anticipate any immediate radical improvement. Scrap is coming out in reasonable quantities, and sales are about equal to the supply. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices.

Heavy melting steel	$9.00 to $9.25
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.75 to 14.75
Old iron axles	21.25 to 21.75
Mixed shafting	13.25 to 13.50
No. 1 wrought and soft steel	10.75 to 11.00
Skeleton (bundled)	7.75 to 8.25
Wrought-iron pipe	8.75 to 9.25
Cotton ties (bundled)	8.75 to 9.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.50 to 5.75
Cast borings	5.50 to 5.75
Machinery, cast	11.75 to 12.25
Malleable	10.25 to 10.75
Stove plate	8.00 to 8.50
Grate bars	7.00 to 7.25
Cast-iron carwheels	13.75 to 14.25

Birmingham

BIRMINGHAM, ALA., September 22, 1913.

Pig Iron.—Additional sales of 5000 to 6000 tons of iron were made in the past week for fourth quarter delivery at $11.50. The two interests participating in the business announce $12 for 1914 business and are not soliciting it at that figure. Two decline to figure on 1914 delivery even at $12. One who sold several thousand tons recently at $11.50 for this year's delivery states that a small lot for 1914 delivery was sold at $12. The live question with most makers at this time is to deliver the iron contracted for. The insistence on prompt shipment of full quotas is by telegram as well as letter. In a number of instances grades of iron ordered have been changed at the solicitation of the seller in order to make up the quantity specified for shipment. But two makers have stocks on hand that are worth mentioning, and one of these says accumulations will be gone by October 1. The other has done the lion's share of the recent bookings and will also rapidly exhaust stocks. Accumulations will probably decline to less than 120,000 tons this month. One lot of No. 1 soft for fourth quarter delivery sold at $12. There seems slight chance of an increase in production. The Woodward Iron Company, which was expected to blow in its new furnace in October, now announces that it will not go in until January. Several lots of charcoal iron have been sold to carwheel works at $24 to $25. The foundry iron market is undoubtedly strong, with prices tending to further advances. We quote per gross ton, f.o.b. furnaces in the Birmingham district, the higher price being the most quoted for 1914 delivery, as follows:

No. 1 soft and foundry	$12.00 to $12.50
No. 2 soft and foundry	11.50 to 12.00
No. 3 foundry	11.25 to 11.75
No. 4 foundry	11.00 to 11.50
Gray forge	10.50 to 11.00
Basic	11.50 to 12.00
Charcoal	24.00 to 25.00

Cast-Iron Pipe.—While the pipe companies have laid in large stocks of pig iron purchased at prices lower than those now quoted, and stand in an advantageous position in case of an influx of orders, the latter has not come. The pipe men are insisting on adherence to quoted prices and it is reported that their firm attitude is being felt. Plants have not increased operations over the scope of the past few months. We quote, per net ton, 4 in. at $22 and 6 in. and over at $20, with $1 added for gas pipe.

Coal and Coke.—Coke was a little quieter the past week, but the demand for the entire foundry output at prevailing prices still exists. The limited supply of furnace coke available for the general trade is also firm. We quote as follows, per net ton at oven: Furnace, $3.25 to $3.50; foundry, $3.75 to $4.25.

Old Material.—The improved condition of the market continues. Yards are increasing stocks and disposing of them in short order. The demand is a general one and movements of a variety of grades have been large. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles (light)	$15.00 to $15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram carwheels	10.50 to 11.00
Standard carwheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

British Blast Furnaces Stopping

Pig Iron Prices Said to Be at Cost —Undertone of Market Is Weak

(By Cable)

LONDON, ENGLAND, September 24, 1913.

Blast furnaces are now going out, chiefly those making hematite. Five have recently stopped. Prices are said to be at cost, with the demand poor. America is inquiring for semi-finished steel and is rumored (unconfirmed) to have bought pig iron. The German Steel Works Union has decided to reduce prices of steel beams and semi-finished steel for the last quarter 5 marks ($1.19) per ton. Stocks of pig iron in Connal's stores are now 175,705 gross tons, against 180,184 tons a week ago. We quote as follows:

Cleveland pig-iron warrants (Tuesday), 54s. 8d. ($13.30), against 54s. 4½d. ($13.25) a week ago.

No. 3 Cleveland pig iron, makers' price f.o.b. Middlesbrough, 55s. 3d. ($13.44), against 55s. ($13.38) a week ago.

Ferromanganese, £10 11s. 9d. ($51.53), f.o.b. shipping port.

Steel sheet bars (Welsh), delivered at works in Swansea Valley, £4 15s. ($23.11).

German sheet bars, f.o.b. Antwerp, 87s. 6d. ($21.29).

German 2-in. billets, f.o.b. Antwerp, 80s. ($19.46).

German basic steel bars, f.o.b. Antwerp, £4 14s. ($22.87).

Steel bars, export, f.o.b. Clyde, £6 10s. ($31.63).

Steel joists, 15-in., export f.o.b. Hull or Grimsby, £6 2s. 6d. ($29.81).

German joists, f.o.b. Antwerp, £5 8s. to £5 11s. ($26.28 to $27.01).

Steel ship plates, Scotch, delivered local yards, £7 15s. ($37.72).

Steel black sheets, No. 28, export f.o.b. Liverpool, £9 5s. ($45.02).

Steel rails, export, f.o.b. works port, £6 7s. 6d. ($31.02), a decline of 2s. 6d. (61c.).

Tin plates, cokes, 14 x 20, 112 sheets, 108 lb. f.o.b. Wales, 13s. 1½d. ($3.19).

St. Louis

ST. LOUIS, MO., September 22, 1913.

Both buyer and seller seem content to play a waiting game, the one because he does not feel sure as to prices and the other because he does not want to commit himself at present figures to contracts covering any great period of time. However, prices stand out even more firmly than ever, especially in pig iron, with scrap the only discouraging feature.

Pig Iron.—Transactions have been chiefly in carload, 50-ton and 100-ton lots, with here and there an order for 200 tons, and all for immediate and last quarter delivery. Nothing is reported for first quarter or first half and furnace representatives quite generally are under instructions to discourage efforts to buy for prompt shipment and last quarter with the intention of carrying delivered materials in the yards into the next year. For first half a quotation is being made on No. 2 Southern, Birmingham basis, of $12 per ton, but this is more to discourage business for a time than as a basis for real transactions. There is an inquiry in the market for 2000 tons of malleable closing this week and the 2000 ton inquiry for Northern basic, reported last week, was sold for delivery into St. Louis territory by a Chicago furnace. Quotations on No. 2 Southern, Bir-

mingham basis, for last quarter are $11 to $11.50 per ton, No. 2 X Chicago stands here at $15 per ton and Ohio iron at $14.50, Ironton basis. All these figures are very firmly held.

Coke.—The market has been rather quiet, with only small sales of foundry grades. An inquiry is in the market for 2000 tons of furnace coke to close the current week. By-product coke is selling on a parity with Connellsville.

Finished Iron and Steel.—New orders on structural steel have kept up with previous rates and have shown some slight increase in the total, though no large new contracts have been placed. Fabricating shops continue busy and see plenty of work in sight. Reinforcing bars are in fair demand and the same is true of ordinary bars, while agricultural interests continue to take a satisfactory amount of material. Light rails are only in light request, chiefly from the coal interests. Plates are quiet. Track fastenings are in only normal request. Business conditions generally are regarded as indicating increased orders in nearby months.

Old Material.—Scrap market prices are largely nominal. Lists which have come out with St. Louis deliveries include 9000 tons from the Illinois Central, 3500 tons from the Chicago, Burlington & Quincy and 3000 tons from the Great Northern. The rolling mills and steel mills are taking considerable quantities direct and also from dealers on contract only, while the latter are taking from the roads to fill contracts which they have made. Relaying rails are in sharp request still and equally hard to get. We quote dealers' prices f.o.b. St. Louis as follows:

Per Gross Ton.

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.00 to 11.50
Old steel rails, less than 3 feet	10.00 to 10.50
Relaying rails, standard section, subject to inspection	23.50 to 24.50
Old carwheels	11.25 to 11.75
Heavy melting steel scrap	9.50 to 10.00
Shoveling steel	9.00 to 9.50
Frogs, switches and guards cut apart	9.50 to 10.00

Per Net Ton.

Iron fish plates	$11.00 to $11.50
Iron car axles	19.00 to 19.50
Steel car axles	14.50 to 15.00
Wrought arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	9.00 to 9.50
Steel couplers and knuckles	9.00 to 9.50
Locomotive tires, smooth	10.50 to 11.00
No. 1 dealers' forge	9.50 to 10.00
Mixed borings	4.00 to 4.50
No. 1 busheling	8.50 to 9.00
No. 1 boilers, cut to sheets and rings	6.00 to 6.50
No. 1 cast scrap	10.00 to 10.50
Stove plate and light cast scrap	7.50 to 8.00
Railroad malleable	8.50 to 9.00
Agricultural malleable	7.00 to 7.50
Pipes and flues	6.75 to 7.25
Railroad sheet and tank scrap	6.00 to 6.50
Railroad grate bars	7.00 to 7.50
Machine shop turnings	5.00 to 5.50
Bundled sheet scrap	5.00 to 5.50

Buffalo

BUFFALO, N. Y., September 22, 1913.

Pig Iron.—The week has shown a slowing up in the placing of new business as compared with the last two or three weeks, the aggregate for the week being less than half of that of the previous week. The halt is undoubtedly traceable to some extent to the tariff and currency situation as well as to the fact that many users are practically covered for their requirements for the fourth quarter and are not as yet considering 1914 business to any great extent. Most melters continue to urge prompt and rush shipments on existing contracts. Furnacemen are very hopeful regarding the outlook and are not inclined to consider 1914 inquiries except at higher than fourth quarter prices. Some selling interests have apparently eased up slightly on prices quoted this week for fourth quarter delivery, one producer being reported as quoting $14 to $14.25 for No. 2 X foundry, but the average quotation for that grade is $14.50, with some producers asking $14.75. We quote as follows for fourth quarter f.o.b. furnace:

No. 1 foundry	$14.50 to $15.00
No. 2 X foundry	14.25 to 14.75
No. 2 plain	14.00 to 14.25
No. 3 foundry	14.00
Gray forge	13.75 to 14.00
Malleable	14.50 to 14.75
Basic	14.50 to 14.75
Charcoal, regular brands	15.75 to 16.75
Charcoal, special brands and analysis	17.00 to 20.00

Finished Iron and Steel.—Inquiry is good, the volume being greater than for some weeks past and contract coverings better, particularly in bar material, hoops, bands and sheets. Orders aggregating a large tonnage in wire and wire products have been placed this week both with the principal interest and with independents at the ruling prices, $1.45 for wire and $1.65 for wire nails. One interest reports having taken a larger aggregate tonnage than for a like period in some months, being 1500 tons of wire, with no deviation from regular prices. In structural material the market continues to show an active demand. Local fabricators are all busy and the outlook for this district for several months ahead looks very promising and architects have a number of new building projects on the boards, which will develop into requests for bids within the next few weeks. Plans are being completed by architects Esenwein & Johnson, this city, for a 10-story addition to the Onondaga Hotel, Syracuse, which will take about 900 tons of steel. Plans are also being completed by Architects Green & Wicks for the South Side high school, Buffalo, requiring between 1400 and 1500 tons. The city of Buffalo will call for bids this week for public school No. 13, taking about 100 tons. It is expected the Delaware, Lackawanna & Western will soon be in the market for 8000 to 9000 tons of structural steel for the construction of its new passenger terminal and elevated approaches. Altogether there is about 15,000 tons of steel above ordinary requirements due to come out in the Buffalo district between now and the end of the current year. The Lackawanna Bridge Company, this city, has taken a contract for about 1000 tons of bridge work for the Chicago & Eastern Illinois.

Old Material.—The market is somewhat unsettled with very light demand in most lines. Turnings and borings continue to be the most active commodities on the list and heavy melting steel is the least active. Some business has been done in cast scrap for local consumption. We quote as follows per gross ton, f.o.b. Buffalo:

Heavy melting steel	$10.50 to $11.00
Boiler plate, sheared	12.50 to 13.25
Bundled sheet scrap	8.00 to 8.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50
Low phosphorus steel scrap	16.50 to 17.00
Iron rails	15.00 to 15.50
No. 1 railroad wrought	13.00 to 13.50
No. 1 railroad and machinery cast scrap	13.00 to 13.50
Steel axles	17.00 to 17.50
Iron axles	22.50 to 23.00
Carwheels	12.50 to 13.00
Railroad malleable	12.00 to 12.50
Locomotive grate bars	10.00 to 10.50
Stove plate (net ton)	9.75 to 10.00
Wrought pipe	9.50 to 10.00
Machine turnings	6.00 to 6.50
Heavy steel axle turnings	8.00 to 8.75
Clean cast borings	6.25 to 6.75
Bundled tin scrap	14.00

New York

NEW YORK, September 24, 1913.

Pig Iron.—Current business in foundry pig iron is about of the character reported in the last two or three weeks—lots ranging from 200 to 500 tons, with an occasional contract for 1000 tons. The deliveries are for fourth quarter only, fourth and first quarters, and in a few cases for the first half of next year. There is little disposition on the part of consumers to buy at present prices for many months ahead, and producers in quoting for such delivery generally ask enough more money to limit the business. Neither side, in fact, has a definite enough view of the future to be considered a working basis for free operations. Some business has been done in New England, competed for by Buffalo and middle Pennsylvania furnaces. Some of the latter have made prices figuring back to rather a lower level at furnace than that considered established. In general, however, the attitude of furnaces is firm. The fact that so many foundries are buying only moderate lots is considered a guaranty that a fair volume of repeat business will come along in the next two or three months. One Brooklyn foundry has closed in the past week for fourth and first quarter requirements, the purchases, mainly from Virginia and Buffalo, being variously estimated from 600 to more than 1000 tons. Some of the New York district business in the past week or two has been hastened by the desire to get iron from Buffalo before navigation closes. Foundry operations seem to be on the same scale as for some weeks, with no definite indication of falling off or of increase. Stocks at foundries are evidently not large and requests for the hurrying of shipments are three to four times as many as those for holding up iron called for by contract. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $16 to

$16.25; No. 2 X, $15.75 to $16; No. 2 plain, $15.50 to $15.75. Southern iron is quoted at $15.75 to $16.25 for No. 1 foundry and $15.25 to $15.75 for No. 2.

Ferroalloys.—Inquiries for 80 per cent. ferromanganese are more numerous this week than last, totaling about 3000 tons in spite of the fact that part of the inquiries for 1500 tons reported then were withdrawn. Most of the business is for prompt delivery. The majority of the sales are probably at the producers' price of $56, Baltimore, and any shading of this is evidently becoming less each week. A steady business is being done in ferrosilicon at the usual price of $75, Pittsburgh, for carloads; $74 for 100 tons and $73 for 600 tons and over.

Finished Iron and Steel.—In spite of prognostications from high places of lower prices, representatives in this market of steel mills are getting much encouragement from the continued run of business taken for immediate use. The volume is fluctuating with different mills, from week to week, so that no particular tendency is noted. The apathy in financial quarters, influenced by general business conditions and the readjustment expected as a result of tariff legislation, is the widely accepted explanation. In the structural field some prominence is given to the probability of early business resulting from the railroad grade relocation in Buffalo, a number of railroads being interested in addition to the Lehigh Valley, the inquiries of which were noted last week. A new loft project in New York, requiring 500 tons, is reported; a building for R. G. Dun & Co. in Brooklyn, 500 tons, is to be built, and 800 tons has been closed with the Hinkle Iron Company for the Almore apartment and 500 tons has been taken by the American Bridge Company for the Otis Elevator Company at Harrison, N. J. Other structural projects which have come to light include 2000 tons for an Atlantic City hotel and 1000 tons for a hospital at Holyoke, Mass. The 1700 tons for New York Central terminal area work reported closed has been given to the Fort Pitt Bridge Works, and the McClintic-Marshall Construction Company is to provide the 100 tons of canopies for the New York Central. In the railroad car field an interesting inquiry comes from the Buffalo, Rochester & Pittsburgh, interesting because of a belief that its appearance marks a low level in prices for cars. In steel bars it is learned that the Stone & Webster Corporation has increased its inquiry of 1000 tons of reinforcing bars for early use to 5000 tons for shipment over a year. We quote plain structural material and plates, mill shipments, at 1.40c. to 1.45c., base, Pittsburgh, or 1.56c. to 1.61c., New York; steel bars, mill shipments, are 1.40c., Pittsburgh, or 1.56c., New York, and bar iron, 1.40c. to 1.45c., New York; we quote shipments from store at 2.10c. to 2.15c. for plain material; 2c. to 2.05c. for steel bars and 2.05c. to 2.10c. for iron bars.

Old Material.—A sale is reported of 1000 tons of heavy melting steel scrap at $11.75, delivered in eastern Pennsylvania. No other transaction in steel scrap has come to light in this district, while on the other hand some important consumers are asking for shipments to be deferred on scrap which was to have been delivered this month. Rolling mills are doing little in the purchase of stock, while foundries are not departing from their policy of purchasing sparingly. The market generally is decidedly dull. Dealers' quotations are as follows, per gross ton, New York:

Old girder and T rails for melting	$9.25 to	$9.75
Heavy melting steel scrap	9.25 to	9.75
Relaying rails	21.50 to	22.00
Rerolling rails	12.50 to	13.00
Iron car axles	22.00 to	22.50
Steel car axles	16.00 to	16.50
No. 1 railroad wrought	12.50 to	13.00
Wrought-iron track scrap	11.00 to	11.50
No. 1 yard wrought, long	10.50 to	11.00
No. 1 yard wrought, short	10.00 to	10.50
Light iron	3.50 to	4.00
Cast borings	5.50 to	6.00
Wrought turnings	5.00 to	5.50
Wrought pipe	9.00 to	9.25
Carwheels	12.00 to	12.50
No. 1 heavy cast, broken up	11.25 to	11.75
Stove plate	8.50 to	9.00
Locomotive grate bars	7.50 to	8.00
Malleable cast	9.00 to	9.50

Cast-Iron Pipe.—The Warren Foundry & Machine Company was the successful bidder on about 6500 tons of 4 to 36 in. for the city of Lynn, Mass., on which bids were opened September 16. The Department of Water Supply, Gas and Electricity of this city will purchase, September 26, considerable quantities of pipe for stock in city yards in Manhattan, Brooklyn and Bronx boroughs. Specifications have not yet been issued, so that the actual quantities to be bought are not yet known. Expectation is strong that bids will shortly be called for on the 36-in. flexible joint pipe to be needed in extending the Catskill water supply to Staten Island. The quantity covered by this work is variously estimated at 3000 to 8000 tons, probably depending on whether one or two mains will be provided for. The general demand continues quiet. Carload lots of 6 in. are selling at $23 to $24 per net ton, tidewater, New York, according to the weight of pipe and quickness of shipment.

Metal Market

NEW YORK, September 24, 1913.

The Week's Prices

Cents Per Pound for Early Delivery.

	Copper, New York.			Lead		Spelter	
Sept.	Lake.	Electrolytic.	Tin, New York.	New York.	St. Louis.	New York.	St. Louis.
18	16.87½	16.75	41.95	4.75	4.60	5.80	5.65
19	17.00	16.75	42.10	4.75	4.60	5.80	5.65
20	17.00	16.75	.....	4.75	4.60	5.80	5.65
22	17.00	16.75	41.70	4.75	4.60	5.80	5.65
23	17.00	16.75	41.75	4.75	4.60	5.80	5.65
24	17.00	16.75	41.85	4.75	4.60	5.80	5.65

Copper continues quiet, but firm. For tin there has been but little demand and prices are lower. Lead is dull and lower prices are predicted. Spelter is quiet and a weaker tendency is apparent. Antimony is still neglected.

New York

Copper.—Both Lake and electrolytic have been quiet in a practically nominal market. There has been no more pressure to sell than there has been inclination to buy. The resale lots of Lake, which could have been had a week ago at 16.87½c., cash, have disappeared, and 17c., cash, is now the quotation. Electrolytic is unchanged at 16.75c., cash, or 16.87½c. 30 days delivered. The principal feature of the market is the sold-up condition for early delivery of the big agencies. Except in a small way it is almost impossible to get September and October copper, while the quantity available for November is limited and any transactions involving large quantities must concern December metal. As a result of speculative influences, standard declined £2 in London to-day. It is not believed that this decline will affect the price of domestic metal unless the declining tendency is maintained, particularly inasmuch as it is offset by the statistics of supplies. London quotations to-day were £72 2s. 6d. for spot and £72 for futures. Exports this month total 25,131 tons.

Pig Tin.—The demand has been light. If there has been any inquiry for one position more than for another it was for futures. For the latter there was some inquiry and some buying, but no business that could be called large. Available supplies are ample but still fairly concentrated. Dealers are showing little tendency to dispose of their holdings, while buyers are equally slow in making purchases. Since a week ago prices have declined; to-day 41.85c. is asked, while on Monday sales were made as low as 41.70c. Quotations in London to-day are £191 for spot and £191 10s. for futures. Arrivals this month total 3069 tons and there is afloat 3040 tons.

Lead.—Consumers are well supplied and have kept out of the market to an extent which has caused dullness. The largest interest adheres to its price of 4.75c., New York, and the St. Louis price is 4.60c. There is expectation of a sagging off of the latter price in particular.

Spelter.—The market is quoted at 5.80c., New York, and 5.65c., St. Louis, but there is every probability that these figures might be shaded five to ten points. The demand is light. Foreign spelter has been offered here but has found no takers. One reason for this indisposition to buy the imported metal is that when there is no pronounced advantage in cost consumers prefer the domestic, with the qualities of which they are more familiar.

Antimony.—This market continues neglected, although there is some interest as to what is going to happen when the new tariff becomes operative and the immense stock of antimony, said by some authorities to approximate a year's supply, is withdrawn from the bonded warehouses where it has been accumulating. Some dealers declare there is no profit in present prices and that one of two things is true, either that metal is being sold which was bought about two years ago or that sales are being made at an actual loss. Quotations are 7.75c. to 8c. for Hallett's, 8.35c. to 8.40c. for Cookson's and 7.37½c. to 7.50c. for Chinese and Hungarian grades.

Old Metals.—The market is firm at unchanged prices.

Chicago

SEPTEMBER 22.—The long continued strike in the Lake copper district has produced a very tight situation in future contracting. Since August practically no new contracts have been made, and current shipments are confined to July contracts which run out in October. Unless relief is had, a strong demand for electrolytic seems inevitable. The spelter market is decidedly irregular and a variety of quotations are current. Tin prices have suffered a reaction and are quotably lower. We quote as follows: Casting copper, 16.75c.; Lake, 17c. to 17.25c., for prompt shipment; small lots, ¼c. to ⅛c. higher; pig tin, carloads, 42.50c.; small lots, 44.50c.; lead, desilverized, 4.70c. to 4.75c.; corroding, 4.95c. to 5c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.70c.; Cookson's antimony, 10.50c., and other grades, 9.75c., in small lots; sheet zinc, $8, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots: Copper wire, crucible shapes, 14c.; copper bottoms, 12.75c.; copper clips, 13.25c.; red brass, 12.75c.; yellow brass, 9.50c.; lead pipe, 4.12½c.; zinc, 4.25c.; pewter, No. 1, 26c.; tinfoil, 32.50c.; block tin pipe, 36c.

St. Louis

SEPTEMBER 22.—Missouri products have shown some tendency to ease off, and at the close to-day lead was quoted at 4.60c., with offers at 4.65c., and holders quite firm. Spelter also declined and at the close was quiet but firm at 5.67½c. to 5.70c. Lake copper is quoted at 17.35c.; electrolytic, 17.15c. to 17.25c.; tin, 41.97½c. to 42.22½c.; Cookson's antimony, 8.65c. The Joplin ore market showed a falling off from the previous week, the basis range being $45 to $47 per ton, with the top settlement for choicest lots at $50. Calamine sold at $21 to $23 on a basis of 40 per cent., with the top settlements as high as $27. Lead remained unchanged, selling at $58 for 80 per cent. We quote miscellaneous scrap metals as follows: Light brass, 5.50c.; heavy brass and light copper, 10c.; heavy copper and copper wire, 11.50c.; lead, 3c.; tinfoil, 30c.; pewter, 24c.; zinc, 2.75c.; tea lead, 2.75c.

Iron and Industrial Stocks

NEW YORK, September 24, 1913.

The stock market was quite strong through the greater part of the week, iron and industrial stocks not being seriously affected by the severe slump in the Rock Island Railroad stocks, which had some influence on other railroad securities. The equipment stocks have held up to some extent, but have not been as strong as in the previous week. Cambria steel was active at higher prices. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Am. Can, com.....	34⅛- 36⅜	Railway Spring, pref.	96 - 96¾
Am. Can, pref.....	95½- 99	Republic, com.....	23⅞- 25
Am. Car & Fdy., com.	47 - 47⅝	Republic, pref.....	88½- 89
Am. Loco., com.....	34 - 35½	Rumely Co., com...	20 - 23
Am. Loco., pref....104	-105	Rumely Co., pref...	54½- 55
Am. Steel Foundries	30 - 30⅛	Sloss, com.....	35 - 35½
Bald. Loco., com...	44⅞- 45½	Pipe, com.	12⅜
Beth. Steel, com....	36 - 36¼	U. S. Steel, com....	63¾- 65½
Beth. Steel, pref....	72¾- 73¼	U. S. Steel, pref...109¼-109¾	
Colorado Fuel	32½- 34	Va. I. C. & Coke...	44 - 45
Deere & Co., pref..	97⅛- 98⅛	Westinghouse Elec...	70⅜- 72
Emer-Brant, com.....	25	Am. Ship, com.....	41
General Electric.....146	-147¼	Am. Ship, pref.....	93 - 95½
Gt. N. Ore cert....	37 - 39⅞	Chic. Pneu. Tool...	53½- 55¼
Int. Harv., com....109¼-110½		Cambria Steel	48¾- 52
Int. Harv., Corp...110	-110¼	Lake Sup. Corp....	25¾- 26
Int. Harv., Corp., pref....114¾		Pa. Steel, pref.....	66 - 67
Int. Pump, com.....	7¼	Warwick	10½- 10⅞
Nat. En. & St., com.....	13½	Crucible Steel, com.	16½- 17
Pittsburgh Steel, pref.....	94	Crucible Steel, pref.	92¾- 94
Pressed Steel, com..	27 - 28¾	Harb. Walk. Ref., pref....101	
Pressed Steel, pref.....100		La Belle Iron, com.....	46
Railway Spring, com.	26¾- 27¼		

Dividends Declared

The Continental Can Company, regular quarterly, 1¾ per cent. on the preferred stock, payable October 1.

The Taylor-Wharton Iron & Steel Company's dividend on the preferred stock, payable November 1, is 1¾ per cent., and not 1½ per cent. as printed in this column last week. The preferred is a 7 per cent. stock.

The United States Cast Iron Pipe & Foundry Company, regular quarterly, 1 per cent. on the preferred stock, payable October 15.

The Crucible Steel Company of America, regular quarterly, 1¼ per cent. on the preferred stock, payable September 30.

Sharon Steel Hoop Company, regular quarterly, 1¾ per cent., payable October 1.

The Canadian-Westinghouse Company, Ltd., regularly quarterly, 1¾ per cent., payable October 10.

The Western Electric Company, regular quarterly, $2 per share, payable September 30.

The Pittsburgh Gage & Supply Company, regular quarterly, 2 per cent., payable October 1.

The Chicago Pneumatic Tool Company, regular quarterly, 1 per cent., payable October 25.

Pennsylvania Railroad's Cambria Holdings.—Reports have again been printed in the past week of negotiations by the Pennsylvania Railroad for the sale of its holdings of $22,504,100 of the Cambria Steel Company's $45,000,000 stock. A Chicago district steel company and Cincinnati interests have been mentioned among possible purchasers and the name of an Eastern steel company has also been connected with the matter. Henry C. Frick is quoted in denial of the report that he is interested in the purchase of control of the Cambria company.

The Hecla-Winslow Company has been incorporated under the laws of the State of New York, to take over the Hecla Iron Works of Brooklyn and the Winslow Brothers Company of Chicago. It will have an authorized capital stock of $1,750,000, and its main office will be at Park avenue and Fortieth street, New York City. Charles M. Eger, who has been president of the Hecla Iron Works, will be chairman of the board of directors of the new company, and W. H. Winslow, of Chicago, will be president. Francis D. Jackson, who has been first vice-president of the Hecla Iron Works, will continue as general Eastern manager. Both companies are manufacturers of architectural and ornamental iron work and bronze work for building purposes.

Howe & Samuels, Danville, Pa., are building a new plant adjacent to their present mill in that city. The new plant will house their present 19-in. muck bar mill and necessary equipment and will be ready for occupancy about January 1, 1914. The present yearly capacity is 6000 tons of low phosphorus muck bar on single turn, which will be increased to 7500 tons single turn, and will enable them to operate double turn if desired. Boilers, engines and equipment for the new plant have already been secured.

A Philadelphia dispatch says that a conference of iron, steel and machinery manufacturers will be held there November 20 on the trade possibilities of the Panama Canal. J. Edward Randolph Wood, of the Philadelphia Board of Trade, and others are moving in the matter. Metal-working industries of Pennsylvania, Delaware, Maryland and New Jersey will be asked to send delegates.

Over 700 vanadium steel cast locomotive frames are in service on the New York Central & Hudson River Railroad. While there have been no failures of vanadium frames applied in 1908 to heavy Pacific type locomotives, 35 failures are reported of carbon steel frames on the same class of engines built in the same year and operating in similar service, the design of the frames being identical.

Two Terry turbine-driven forced-draft blower sets, each unit rated to deliver 250,000 cu. ft. per min., are to be installed at the Rhode Island Company's power plant at Providence, R. I. Each unit consists of a 600-hp. turbine, driving through a set of Falk reduction gears an American double-inlet Sirocco blower. The turbines run at a speed of 3370 r.p.m. and the blowers at 460 r.p.m.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed a contract with the Mesta Machine Company, Pittsburgh, Pa., for a 46 x 76 x 60-in. twin tandem compound condensing horizontal reversing engine for driving the blooming mill of their new steel plant.

The Wire Specialty Machine Works, South Bend, Ind., producer of wire forming and builder of automatic wire forming machines and special machinery, has changed its name to the Campbell Wire Specialty Works.

S. DIESCHER & SONS,
Mechanical and Civil Engineers,
PITTSBURGH, PA.

Pittsburgh and Vicinity Business Notes

Business men of Salina, Pa., have formed the Salina Coal & Clay Company, as a successor of the Salina Fire Brick Company, and are making plans for starting the plant. To furnish funds for operations, a mortgage of $300,000 has been filed in Westmoreland County, covering the lands of the company in the northern part of the county, and 20-year bonds will be issued. The reorganization of the company was brought about through the efforts of Edwin S. Naly.

The Union Switch & Signal Company, Pittsburgh, received orders in August to the amount of over $500,000, and is operating its works at Swissvale to their utmost capacity.

The Keystone Steel Foundry Company, which formerly operated a plant at Avonmore, Pa., making steel castings, is being reorganized and will be known as the Kiski Steel Casting Company. The plant, which has been idle for several years, is being put in shape for operation and is expected to start up in the near future. H. C. Barnhart, of Marion, Ohio, will be general superintendent, and Charles Beihl, of Tarentum, Pa., will likely be president of the new company.

The Standard Fire Brick Company, which recently completed a plant at Empire, Ohio, has opened offices in the Diamond Bank Building, Pittsburgh, with E. W. Ballantyne in charge. The plant has a capacity of 50,000 brick daily and is equipped for the manufacture of paving blocks, fire brick and fire clay. It is operated entirely by electric drive.

In April last an order was made by the court for a receivers' sale of the plant of the Keystone Tube Works at Connellsville, Pa. Last week the Citizens Title & Trust Company, of Uniontown, Pa., asked that the order for the sale be revoked, and it is possible that the concern will be reorganized and operated by new owners.

The West Leechburg Steel Company, Farmers' Bank Building, Pittsburgh, manufacturer of hot and cold rolled strip steel, is making some improvements and additions to its plant at West Leechburg, Pa. These include the erection of an additional 40-ton open-hearth steel furnace and gas producers of sufficient capacity to supply the plant with fuel in case of a shortage of natural gas. The contract for the open-hearth furnace has been placed with the S. R. Smythe Company, House Building, Pittsburgh, and for the gas producers with the Duff Patents Company, Frick Building, Pittsburgh. The new furnace will be ready for operation about December 1.

This week the annual convention of the Illuminating Engineers' Society is in session at the Hotel Schenley, Pittsburgh. The convention will last until Thursday, September 25, and the programme includes visits of inspection to the larger industrial plants in the Pittsburgh district.

Rebecca furnace of the Kittanning Iron & Steel Mfg. Company at Kittanning, Pa., has been blown out for relining and repairs, which will require from six weeks to two months to complete.

For about three years the plant of the Kidd Brothers & Burgher Steel Wire Company at Aliquippa, Pa., has been operated by T. W. Friend, of Pittsburgh, receiver. Steps are being taken to take the property out of the hands of the receiver, and the court at Pittsburgh has directed the receiver to discontinue operations October 1. At a recent meeting of the creditors a ways and means committee was appointed to make a report at another meeting to be held in the Oliver Building, Pittsburgh, September 27. E. S. Rooney, Pittsburgh representative of the Youngstown Sheet & Tube Company, is on the committee, and indications are that a new company will be formed to operate the plant.

The Sharon Foundry Company, Sharon, Pa., has placed contracts for the erection of three fire-proof buildings, each 50 x 100 ft., to replace the pattern shop destroyed by fire some weeks ago at Wheatland, Pa. The buildings will be constructed of steel, brick and concrete, and are expected to be finished within 90 days.

The Inland Steel Company, Chicago, has opened a district sales office at Milwaukee, Wis., in room 1003 Majestic Building, with C. M. Easterly in charge.

British Iron and Steel Exports Still Increase

The iron and steel exports of Great Britain for the first eight months of 1913 show an increase, both in tonnage and value, over the same period for 1912. The total sent abroad up to September 1, 1913, excluding iron ore and including scrap, was 3,416,069 gross tons, against 3,172,110 tons for the same period in 1912, an increase of 233,959 tons. In values the increase in imports for the first eight months is also large, the total being £37,118,607 as compared with £30,145,062 tons up to September 1, 1912. Exports of pig iron continue to fall, the total, including ferroalloys, being 744,334 gross tons up to September 1, 1913, as against 867,569 tons for the same period in 1912, in spite of the fact that exports of ferroalloys showed an increase of nearly 30,000 tons up to September 1, 1913. The exports of galvanized sheets were nearly 96,000 tons greater to September 1, 1913, than for the first eight months of 1912.

The import figures for iron and steel, excluding iron ore and including scrap, for the first eight months of 1913 show an increase of 233,661 gross tons, totaling 1,527,003 tons up to September 1, 1913, as compared with 1,290,392 tons for the same period in 1912. Values for these periods are £10,283,863 and £8,179,140 respectively.

The Brass Manufacturers' Association

The National Association of Brass Manufacturers held one of the most successful meetings of its existence at the Clifton Hotel, Niagara Falls, Ontario, on Tuesday and Wednesday, September 16 and 17. The attendance was unusually large, a fact which quite agreeably surprised the officers as well as those forming the assemblage. Quite a number of Canadian brass manufacturers, who had been especially invited to attend the meeting, were present. The Regar Brass Works and the Sterling Brass Company, Cleveland, Ohio, were elected to membership.

The association adopted a uniform standard flange for all ½, ⅝ and ¾-in. compression, Fuller, self-closing and ground key bibbs, whether male or female flange, solid or loose pattern, of 2¼ in.

The list committee, which has in hand the compiling of matter for the new official catalogue, to be issued September 1, 1914, and which will embody many new goods that changed conditions have brought into use, reported progress.

The association renewed its allegiance to the matter of terms of 2 per cent., 10 days, from date of invoice, 60 days net.

It appeared that, owing to the high price as well as scarcity of ingot copper, most manufacturers felt it necessary to withdraw prices and will quote new prices upon request.

The next meeting will be held in New York City December 10 and 11, and on the night of the latter day the association will give its annual banquet. Messrs. Hale, Hills and Webster were appointed a committee to make the necessary arrangements.

Germany's Exports for Seven Months

The following table gives the statistics of Germany's exports of iron and steel products for July and for the seven months ended with July for the past two years, the quantities being in metric tons (2204 lb.):

	July		Jan.-July	
	1913	1912	1913	1912
Total exports	540,643	497,690	3,809,830	3,425,706
Pig iron	69,413	86,799	513,535	595,715
Blooms, billets, etc.	41,812	60,316	373,012	382,156
Beams	43,549	44,410	301,490	274,805
Other structural shapes	102,286	67,678	643,036	480,987
Plates (above No. 6 gauge)	39,448	22,708	263,785	168,646
Wire rods	16,292	15,497	112,391	109,143
Drawn wire	7,893	7,943	53,373	43,107
Tubing	16,674	12,897	114,441	88,166
Steel rails	38,458	39,487	293,215	316,660
Steel railroad ties	9,091	9,031	58,463	76,999
Woven wire products	895	1,589	7,978	8,554
Wire nails	5,378	4,369	38,222	30,397
Scrap	15,708	13,069	120,414	86,352

The total given in the first line of the table includes a number of items in addition to those enumerated, such as machinery, forgings, etc.

Personal

Charles M. Schwab sailed September 20 for Europe, expecting to spend one week on the other side. He stated that his trip had to do with the building of steamships to carry the Bethlehem Steel Company's Chilean iron ore to this country.

Guy E. Tripp, chairman of the Westinghouse Electric & Mfg. Company, returned from Europe September 19. He speaks highly of operations and earnings of the Westinghouse subsidiaries in Europe.

C. L. Miller, vice-president and general superintendent of the American Steel & Wire Company, Pittsburgh, announces new appointments as follows: Jay Waldeck, assistant manager wire mills, Pittsburgh district, succeeding J. W. Smith, resigned; George W. Sells, superintendent North works, Worcester district, succeeding Jay Waldeck, transferred; C. R. Putman, superintendent Waukegan works, Chicago district, succeeding George W. Sells, transferred; G. H. Peters, superintendent American works, Cleveland district, succeeding C. R. Putman, transferred. The office of the chief engineer at Worcester, Mass., has been discontinued. A. F. Backlin will hereafter be attached to the Pittsburgh office with the title of construction engineer. The papers which have heretofore gone to the office of the chief engineer at Worcester for approval are to be sent in the future to Mr. Backlin at Pittsburgh for disposition.

John R. Scott, manager of the Cleveland sales office of the Carnegie Steel Company, will start October 1 for a several months' tour through Europe.

Adolph Greiner, since 1887 general director of the Société John Cockerill, Seraing, Belgium, was elected president of the Iron and Steel Institute at its autumn meeting at Brussels, September 1 to 4. His whole career has been with the Cockerill company, which he entered as a chemist. Under his management the company adopted the basic Bessemer process and through his leadership it has been foremost in the utilization of blast-furnace and coke-oven gases for the generation of power in iron and steel works.

D. C. Alexander, Jr., representing the Department of Commerce, Washington, D. C., spent several days in Milwaukee, Wis., last week in conference with manufacturers, particularly machinery builders, with a view to promoting trade in this line in foreign countries.

After nine years with the Niles-Bement-Pond and Pratt & Whitney companies, the past six years as manager of their Detroit office, A. J. Strong has resigned and on October 1 will assume the duties of factory and sales manager for the Bock Bearing Company, Toledo, Ohio.

F. A. Pope has resigned as secretary, treasurer and manager of the Interstate Foundry Company, Cleveland, Ohio, and has been succeeded as manager by T. H. Gartland, who was formerly manager of the foundry.

W. E. Oakley, manager of the Bayonne Casting Company, Bayonne, N. J., sailed for Panama September 20. His company is now engaged in filling a contract for some 150,000 Monel metal high-tension insulators for the Isthmian Canal Commission. Owing to the non-expansion under high temperatures of its product, the company is finding a good market for castings for use in superheater valves and fittings and also for steam turbine blades.

D. Walker Wear, formerly purchaser for the Chicago Tunnel Company, has been elected vice-president and director of the Stow Mfg. Company, with offices at 443 State street, Binghamton, N. Y.

Major Joseph T. Speer, president Pittsburgh Valve, Foundry & Construction Company, gave his usual annual dinner to the officials and office employees last week at the Hotel Anderson in Pittsburgh, in honor of his 60th birthday. The principal speaker was Elbert Hubbard, who made an address on "Getting Together." The employees presented Mr. Speer with a handsome silver loving cup as a token of their esteem.

H. M. Reynolds has severed his connections with the International Oxygen Company to devote his entire attention to the management of the Dyer Flaming Arc Company, 225 North Tenth street, Philadelphia, of which he is president and general manager.

A. A. Piper, representative of the Electric Controller & Mfg. Company, at Cincinnati, Ohio, has returned from a vacation spent in Canada.

Mark A. Ammon, metallurgical engineer, Toledo, Ohio, and Alvan T. Simonds, Simonds Mfg. Company, Fitchburg, Mass., were elected members of the Iron and Steel Institute at the recent Brussels meeting.

Physical Properties and Analysis of Pig Iron

In *The Iron Age* for May 16, 1912, appeared an article on "Mixtures for Chilled Car Wheels," by "Ironkem," in which the relation between chemical analyses and physical properties was discussed. The point was made that the physical qualities of pig iron are not derivable from the chemical analysis. Prof. Henry M. Howe comments on the article as follows in the Engineering and Mining Journal of September 13:

In an extremely interesting article by "Ironkem," on p. 1206 of *The Iron Age* for May 16, 1912, the following occurs:

The analyses of two lots of No. 2 cast iron are given, together with their breaking strength as follows:

	Close grained No. 2, per cent.	Open grained No. 2, per cent.
Silicon	1.00	1.10
Manganese	0.38	0.53
Phosphorus	0.112	0.116
Sulphur	0.009	0.023
Graphitic carbon	2.72	3.16
Combined carbon	0.99	0.68
Total carbon	3.71	3.84
Breaking strength of 1¼-in. round pins on 12-in. centers	4950 lb. 4500 lb. 4300 lb. ...	2750 lb. 2700 lb. 2700 lb. 2750 lb.

The writer, who is evidently a master of his subject, produces this as evidence to show that "two irons of identical analyses made in the same furnace, from the same ore mixture, can have vastly different physical properties." I call attention to the fact that there is no such closeness in these analyses as the writer evidently thinks. On the contrary, it appears to me that the difference in composition goes a great way toward explaining the difference in physical properties. In the first place, the weak iron has 0.44 per cent. more graphite than the strong, which in itself is an element of weakness; in the second place the weak iron has a combined carbon content of 0.68 per cent. as against 0.99 per cent. for the strong iron. In other words the metallic matrix of the weak iron is that of rail steel, whereas the matrix of the stronger iron is equivalent to 1 per cent. carbon steel, which is, of course, much stronger than rail steel.

Adding to these differences the great difference in the structure, we need not wonder that one iron is so much stronger than the other, and that there is such a difference in the structure of the irons need surprise no one. A slight difference in temperature between the two irons as they run from the furnace might lead to such variations of structure, the hotter iron cooling more slowly than the other. We have by no means reached the end of knowledge in these matters, and we cannot as yet explain fully all the variations in properties. We cannot do this fully even in the simpler case of steel, but we can explain a large part of it.

The Lima Tool & Supply Company, Lima, Ohio, has been incorporated with a capitalization of $10,000, to succeed the Lima Supply Company, which was a partnership. It handles machinists', gas engine and boiler supplies, pipe and pipe fittings, etc. E. R. Smith is president; L. Sutton, vice-president, and F. C. McLeod, secretary and treasurer.

Beaudry & Co., Inc., Boston, Mass., have perfected a direct-connected motor drive for the Beaudry Champion and Beaudry Peerless power hammers. Printed matter on these hammers will be ready, it is explained, in about 30 days. They are now arranging to carry a stock of the motor-driven hammers in addition to belt-driven hammers.

Obituary

Frank B. Rutter

Frank B. Rutter, second vice-president and sales manager of the Scranton Bolt & Nut Company, Scranton, Pa., was killed in the wreck at North Haven, Conn., on the New York, New Haven & Hartford Railroad, Tuesday, September 2, 1913, while a passenger on the Bar Harbor express which was telescoped by the White Mountain express. He was 41 years of age. Born in Lykens, Dauphin County, Pa., he was educated in the public

FRANK B. RUTTER

schools of Lebanon, Pa., from which he entered the employ of the Pennsylvania Bolt & Nut Company, now the American Iron & Steel Mfg. Company, as an office boy. He served for a time as clerk in the rolling mills and from there was transferred to the estimating department of the general offices of the company. After several years in that department, he was chosen teller of the First National Bank of Lebanon, in which capacity he served for four years. He left there July 1, 1903, to accept a position as chief clerk of the accounting department of the Scranton Bolt & Nut Company. On August 1, 1905, he was promoted to assistant to the president in the sales department, and on July 1, 1906, he was made sales manager. In July, 1910, he was chosen a director of the company and elected second vice-president in charge of sales, which position he filled until the time of his death. He was a member of the Manufacturers' Club, of New York City, the Pennsylvania Society of New York, the Engineers Society of Northeastern Pennsylvania, the Scranton Club, and the Country Club of Scranton. On September 5, 1908, he married Grace B. Law, daughter of A. F. Law, president of the Temple Iron Company. Mrs. Rutter lost her life in the same wreck.

JABEZ BURTON STUBBS, formerly vice-president of the Struthers Furnace Company, Cleveland, Ohio, died suddenly September 19, aged 82 years. He was born in Poland, Ohio, and started his career as a railroad telegraph operator. Called to Chicago, he met W. C. Runyon, now president of the Struthers Furnace Company. Together they organized a commission business to deal in pig iron under the name of Stubbs & Runyon. While residing in Chicago he was a member from 1886 to 1891 of the Cleveland firm of Runyon, Stubbs & Mack, but did not take an active part in the business. In 1895 Mr. Stubbs removed to Cleveland and again formed a partnership with Mr. Runyon under the name of Runyon, Stubbs & Co. While this partnership was in existence the Struthers Furnace Company was formed with Mr. Runyon as president and Mr. Stubbs as vice-president, which connection he held until six years ago, when he retired from active business. He leaves a widow and a daughter.

JAMES ROSS, president of the Dominion Coal Company, and prominent in the building of the Canadian Pacific Railroad, died at Montreal September 20, after a short illness, aged 65 years. He was born in Scotland and came to the United States in 1868, engaging with the Wisconsin Central Railroad. Removing to Canada, he became chief engineer and afterward general manager of the Victoria Railroad. At the age of 35 years he built the Canadian Pacific west of Winnipeg, through the Canadian wilderness.

COLIN J. MCDOWALL, manager of the Petroleum Iron Works Company at Sharon, Pa., died September 16 at Hot Springs, Ark., where he had been undergoing treatment for paralysis. He was born in Liecester, England, and came to this country with his parents when a boy. His first employment was with the Armstrong Cork Company, Pittsburgh, and later with the Riter-Conley Mfg. Company. He has been connected with the Petroleum Iron Works Company practically since its organization a few years ago.

ROBERT C. NEAL, Harrisburg, Pa., died September 21, aged 66 years. He was a founder of the Harisburg Rolling Mill Company and had been connected with the Eleanor Iron Company, Hollidaysburg, Pa.; Tyrone Forges, Tyrone, Pa., and Lochiel Iron Works, Harrisburg, Pa. He was the son of William Neal, a prominent iron manufacturer in his day.

NEWLAND T. DEPAUW, president New Albany Mfg. Company, New Albany, Ind., builder of carrying equipment, died recently of apoplexy at his summer home at Haymarket, Va., aged 58 years. He was interested in numerous other industrial enterprises.

The Wheeling Ore Rate

WASHINGTON, D. C., September 23, 1913.—The Interstate Commerce Commission announced on Friday last that it would permit the Pennsylvania Company to reduce its rate of 88c. a ton on iron ore from Lake ports to a portion of the Wheeling district. When the commission handed down its decision in the Pittsburgh Steel Company case and ordered a certain adjustment of rates, the railroads reduced the rate from Lake Erie to the Pittsburgh district from 96c. to 88c. a ton and increased the rate from the lake to the Wheeling district from 60c. to 88c. Other adjustments were also made. The Wheeling & Lake Erie Railroad was not a party to the original proceeding, but it increased its rate to 88c. to certain points in the Wheeling district, and later reduced it to 70c. a ton. The commission, therefore, now permits the Pennsylvania Company to establish a similar rate to the points named in its order. This is the order of the commission:

> That the order heretofore entered in this case on May 29, 1913, be, and the same is, hereby modified so as to permit the Pennsylvania Company to establish, and, until the further order of the commission, to maintain from Cleveland and Ashtabula, Ohio, and Erie, Pa., to Steubenville and Mingo Junction, Ohio, the same rates on iron ore that have been established by the Wheeling & Lake Erie Railroad Company from Cleveland, Huron and Lorain, Ohio, to the same points, without at the same time establishing the same rates to Wheeling, W. Va., and Pittsburgh, Pa., and points taking the same rates.

The commission has not yet fixed a date for taking testimony in the new case filed by the Pittsburgh Steel Company and others against the carriers. It is claimed by the complainants that the railroads by making the adjustments they did defeated the commission's order. Representatives of the complainants believe that the action of the Wheeling & Lake Erie in establishing a 70c. rate and the Pennsylvania Company in doing the same will mean that this rate will be prescribed by the commission to the Pittsburgh district and to all parts of the Wheeling district.

An oil separator, 72 in. in outside diameter and weighing 5300 lb. has been built for the Portsmouth Navy Yard by the National Pipe Bending Company, New Haven, Conn. A feature lies in an arrangement of ports and independent baffles to oppose the current of steam so that there may be no chance of carrying oil into the outlet chamber. The area of the outlets is 1¼ times greater than that of the inlet pipe. The separator is made in two parts to allow for inspection and testing of baffle plates.

Judicial Decisions of Interest to Manufacturers

ABSTRACTED BY A. L. H. STREET

OPERATION OF NEW JERSEY COMPENSATION ACT.—In computing compensation to be paid under the New Jersey workmen's compensation act for injury to more than one finger in the same accident, the total award is properly composed of separate awards for the injury to each finger, as fixed by the act, not exceeding the amount provided for the loss of a hand, and the weekly payments in such case do not run concurrently. (New Jersey Supreme Court, George W. Helme Company vs. Middlesex Common Pleas, 87 Atlantic Reporter 72.)

SALE OF MACHINE WITH REFERENCE TO ANOTHER MACHINE.—Contract to deliver a machine like one owned by a third person is sufficiently complied with if the seller delivers a machine which is substantially of the same kind and which is capable of doing the same work, though there may be slight differences in construction between the two machines. (Alabama Supreme Court, Vinegar Bend Lumber Company vs. Soule Steam Feed Works, 62 Southern Reporter 279.)

EMPLOYER'S LIABILITY FOR CO-EMPLOYEE'S NEGLIGENCE.—In order to hold an employer responsible for injury to one of his employees caused by incompetency of another, it must appear that he knew of such incompetency or could have known thereof by using reasonable diligence; and it must further appear that the employee complained against was habitually negligent or incompetent; and that his negligence in the particular instance caused the accident sued on. (Missouri Court of Appeals, Allen vs. Quercus Lumber Company, 157 Southwestern Reporter 661.)

SUFFICIENCY OF ORDER FOR STEEL.—An order for 36 "bars" of tool steel at 39c. per lb., giving different shapes and sizes of the bars, except as to their length, was sufficiently certain as to the total weight and the price, to be enforceable; it appearing that the word "bar" has an established trade meaning, indicating with reasonable certainty the length into which steel of that kind is usually made for the market. Hence, the buyer cannot defeat liability on his contract of purchase, merely because he did not intend to order such a large quantity. The order having been accepted and executed by the seller, so that the title to the steel passed to the buyer before an attempted revocation of the order, the seller was entitled to stand upon the completed contract, and sue for the amount of the agreed price, on the buyer's refusal to accept the steel, and was not bound to sell the steel in the nearest market and sue for the difference between the market and contract prices. (California District Court of Appeals, Martyn vs. Western Pacific Railway Company, 132 Pacific Reporter 602.)

LIABILITY OF ASSIGNEE OF PATENT.—A company which took an assignment of an inventor's rights under a patent, after judgment had been awarded against the inventor for breach of a contract to grant a third person exclusive rights in the patent, and who was chargeable with notice of the existence of such contract, can be compelled to account to the third person for profits derived by the company. (New Jersey Court of Errors and Appeals, Oscar Barnett Foundry Company vs. Iron Works Company, 87 Atlantic Reporter 160.)

EMPLOYEE'S RIGHT TO WARNING AGAINST DANGER.—An employee directed by his foreman to assist in removing an iron plate from a car was entitled to assume that he would not be exposed to any danger without clear warning against it, and such warning was not given by a signal from his foreman, which might have been intended to initiate some other movement. (Illinois Supreme Court, Hogan vs. Crane Company, 102 Northeastern Reporter 215.)

EMPLOYER'S RESPONSIBILITY FOR FELLOW WORKMAN'S NEGLIGENCE.—Mere inattention of a fellow workman in operating a simple machine whose operation he understood, so that on pulling a lever too soon a plunger was sent up, injuring plaintiff employee, does not make the employer liable for the injury on the theory that the fellow workman was incompetent and his retention in the employment negligent. (Indiana Supreme Court, Simplex Railway Appliance Company vs. Kameradt, 102 Northeastern Reporter 129.)

EFFECT OF WORKMAN'S KNOWLEDGE OF DEFECT.—A workman can recover for injury resulting from a defect in an appliance used by him, though he previously knew of the defect, if he complained to his employer and the latter promised to repair the condition, and the accident occurred before expiration of a reasonable time for making of the repairs. (St. Louis Court of Appeals, Bliesner vs. Riesmeyer Distilling Company, 157 Southwestern Reporter 986.)

LIABILITY CONCERNING UNGUARDED MACHINERY.—Under the Missouri factory act, it is not essential to an employer's liability for injury to an employee, resulting from the former's failure to guard dangerous machinery, that notice was previously given the employer by the factory inspector that guarding was necessary. (St. Louis Court of Appeals, Minier vs. St. Louis Cooperage Company, 157 Southwestern Reporter 1006.) And, under the Pennsylvania act, dangerous machinery must be safeguarded not only for the protection of those working at or about it, but for the safety of all other employees in the establishment who may fairly and without fault on their part come in contact with it. (Pennsylvania Supreme Court, Lanahan vs. Arasapha Mfg. Company, 87 Atlantic Reporter 286.)

INDIVIDUAL LIABILITY OF COMPANY'S OFFICER.—When the president of a company induces a wholesale dealer to extend credit to the company by knowingly misrepresenting the company to be solvent when it is in fact insolvent, he may be held individually liable for the loss thereby sustained by the wholesaler. (Indiana Appellate Court, Lewis vs. Michigan Stove Company, 102 Northeastern Reporter 391.)

NOTICE OF ARRIVAL OF FREIGHT.—Under a clause in a bill of lading providing that the carrier shall only be liable as warehouseman, unless the consignee removes the shipment within 48 hours after he is given or sent notice of its arrival at its destination, notice mailed to, but not received, by the consignee until two days after mailing, will not be deemed to have been given him until he received it, if his place of business is in the same town and is known to the local agents of the carrier, and they could have communicated the notice to him earlier. (Texas Court of Civil Appeals, St. Louis, Brownsville & Mexico Railway Company vs. Hicks, 158 Southwestern Reporter 192.)

RESPONSIBILITY FOR INJURY TO WORKMAN.—An employer is liable for injury to a laborer while assisting in moving a machine, resulting from the use of improper means by his foreman, if the superintendent of the employer's factory was present observing the method of work adopted. The liability extends to the furnishing of unsafe lifting apparatus, such as chain falls. (Connecticut Supreme Court of Errors, Tenney vs. Baird Machine Company, 87 Atlantic Reporter 352.) Where a 16-ton boiler was sold by the manufacturer f.o.b. car, under agreement to furnish the services of one man in the unloading, the buyer furnishing all other necessary assistance, the employees so provided by the buyer cannot be regarded as having been lent to the manufacturer in such sense as to make him and not the buyer liable for injury to one of the latter's employees while engaged in the work, even though the buyer relied on the special experience of the manufacturer's employee in installing the boiler. A laborer engaged in assisting in raising the boiler did not assume the risk of being injured through collapse of supporting staging, resulting in the boiler striking and breaking a steam-pipe and permitting steam to scald the laborer. (Rhode Island Supreme Court, Hoar vs. Lorraine Mfg. Company, 87 Atlantic Reporter 305.)

RESPONSIBILITY FOR DEATH OF VISITOR TO EMPLOYEE.—A manufacturer is not liable for death of a woman who fell into an open pit, while walking along a dimly lighted path to reach the place where her father was at work; a watchman having directed her how she could reach that place safely. (Pennsylvania Supreme Court, Hagan vs. Delaware River Steel Company, 87 Atlantic Reporter 574.)

TIME FOR DELIVERY OF GOODS SOLD.—Agreement by a seller to deliver goods "as soon as possible" requires delivery within a reasonable time, and mere delay in tendering delivery will not justify the buyer in rescinding the contract. In such a case, the buyer, by accepting part of the goods after a long delay, without objection, waives any right to rescind as to the remaining goods, if they are being specially manufactured for him. (142 New York Supplement 697.)

COMPUTATION OF BROKER'S COMMISSION.—An agreement by an iron works company to pay plaintiff a 5 per cent. commission for procuring a contract with a third person for the construction of a coal and ash conveyor according to a certain design, the contract price being $3.60 per 100 lb., entitled plaintiff to commission on the work done on the machinery in accordance with such design, regardless of any changes made in the plan pending the construction work. (New Jersey Supreme Court, Hoisting Machinery Company vs. Goeller Iron Works, 87 Atlantic Reporter 331.)

RIGHT TO RECOVER FOR WORKMAN'S DEATH.—Where the courts have denied an employee recovery for injuries sustained by him, there can be no recovery subsequently for his death resulting from such injuries. (Missouri Supreme Court, Schmelzer vs. Central Furniture Company, 158 Southwestern Reporter 353.)

TERMS OF PAYMENT FOR GOODS.—A sale will be presumed to have been made for cash where nothing was said when the bargain was made as to when payment should be made, and, on the buyer failing to pay on delivery, the seller may reclaim the property. (Arkansas Supreme Court, Hamilton vs. Rankin, 158 Southwestern Reporter 496.)

The Machinery Markets

Quiet trade is still the feature in several of the important machinery markets, although some report improvement. In looking over the entire country it is apparent that fall prospects have not yet opened up sufficiently to cause any notable amount of optimism. The new tariff, soon to become effective, is the subject of very little discussion and the attitude regarding it is one of waiting. New York continues quiet, but prospective small orders may make the total of business in September fair. Sales continue small and scattered in Philadelphia and so far the September average of business is below that of August. While orders continue light, an improvement in inquiry is noted in Cleveland and manufacturing plants in metal working lines are running in a satisfactory way. Small gray iron castings are in demand in that city, although heavy ones have fallen off. Slight improvement is noted in Cincinnati also, and some railroad lists may be disposed of this year, but the export trade is still behind expectations. Detroit has had an encouraging run of orders, manufacturing machinists and die makers are busy and for woodworking and some other machinery used in the trades the demand is good. Conditions in Milwaukee are quiet, most of the orders being for single units. The Central South is quiet, but there is enough going on to cause general satisfaction. Trade in St. Louis continues to improve with inquiry general in character. In Texas, despite late damage to the cotton crop caused by the drought, business is opening up briskly and the fall promises to surpass the same months last year. On the Pacific coast dealers have completed their estimate on Government requirements, have enjoyed a fair run of small orders, and are looking for an increased amount of activity this fall. In that section buying has been held within narrow limits in some lines and while better activity is anticipated no large movements are expected this year.

New York

NEW YORK, September 24, 1913.

The New York market continues quiet, with such sales as are being made of the small and scattered variety. There is prospect, however, of a sufficient number of small orders being closed to make the month's business at least fair. In the near future a list of machine tools will be issued by the Watertown, Mass., Arsenal, but its extent is not yet indicated. There have been reports for some months that the Bethlehem Steel Company was to be a heavy buyer of shop equipment, but the list has not appeared and the trade has no definite information as to when it will appear. The company is now in the market for some machine tools, including some turrets with large spindle capacity, but this requirement is apart from the expected list referred to. Railroads are doing no buying of shop equipment in this territory. So far as the new tariff, which now is practically settled, is concerned dealers in machinery are saying nothing, but waiting to see what effect, if any, it will have upon their affairs.

The Vitaphone Company, Netherwood Station, Plainfield, N. J., will build a 45 x 185 ft. addition to its plant. The company also plans to erect an assembling plant in Canada. The location of this Canadian plant is not yet decided upon.

The Torrey-Eggleston Bushing Company, Millerton, N. Y., has been incorporated with a capitalization of $40,000 to manufacture trolley wheels, bushings, etc., and will establish a plant. The incorporators are F. B. Torrey, Richmond, Me.; L. J. Eggleston, Bath, Me., and D. J. Gleason, Millerton, N. Y.

The New York Central Railroad has awarded contract to the Thomas H. Hopper Company, New York City, for the additions and alterations to its shops at Hammond, N. Y., for the repair of electric locomotives.

The Atlas Crucible Steel Company, Dunkirk, N. Y., has recently increased its capital stock from $150,000 to $1,500,000, some of which is to provide for plant enlargement.

Charles L. Lewis, Ilion, N. Y., has received the contract to construct a waterworks system at Marion, N. Y., at his bid of $23,023.

The Seneca Bridge & Boiler Company, Buffalo, has been incorporated with a capital stock of $75,000 by George W. Stilson, Thomas Brown and Charles A. Randorf. Plans for a manufacturing plant are under way.

The core room building to be erected by the Pratt & Letchworth Company, Buffalo, will be 94 x 112 ft., two stories, brick and steel construction, from plans of the Osborn Engineering Company, Cleveland.

The American Bronze Company, Buffalo, N. Y., has taken out a permit to build a two-story brick factory to be located at 90 Arthur street, to cost $20,000. The company advises that it will require foundry machinery in about two months.

An addition is being made to the plant of the Globe Elevator Company at Tennessee street and the Erie Railroad, Buffalo.

F. K. Brewster, Inc., has been incorporated with a capital stock of $500,000 to manufacture blasting caps, electric blasting caps and fuse. Its plant and factory, which is now in course of construction, is to be located near Port Ewen, N. Y., on the main line of the West Shore Railroad. Frank K. Brewster is president and treasurer; Roswell S. Nichols, secretary. Paul Butler, Lowell, Mass.; John J. Heney, Ottawa, Ont., and Oscar S. Phillips, Suffield, Conn., are other directors.

Construction of the $50,000 factory of the Upson Company, Lockport, N. Y., manufacturer of wall and fiber board, has begun. It will have 60,000 sq. ft. of floor surface. The company advises that it will require an economic type boiler and motors.

The Diamond Match Company is taking bids for a two-story addition, 40 x 120 ft., to be made to its factory at Tenth and Bronson streets, Oswego, N. Y.

The seven-story feed mill of the Clover Leaf Milling Company at Babcock street and the Pennsylvania Railroad, Buffalo, was completely destroyed by fire September 13 with a loss of $200,000 on the mill and machinery. Donald B. Fraser, president of the company, states that the plant will be rebuilt and re-equipped at once.

New England

BOSTON, MASS., September 23, 1913.

The general experience is that users of machine tools —in fact of all kinds of machinery—are finding orders scarce, while many of the users of their equipment are busy. Manufacturers are going slow in increasing capacity. The condition has been accentuated in the past fortnight. Buyers are giving no wholly logical reason for their hesitation. Apparently the influences which should affect the market are no worse than they have been for months. Yet there is a difference in the market. As a whole manufacturing business is normal, but works are operating on accumulated rather than on new orders. The banks are to blame in part, because they are not encouraging extensions of plants by loans. It seems to be a waiting game for the present. Announcements of increased facilities are scarce, and building operations everywhere have diminished. Collections are reported poor.

Hope is expressed in Providence, R. I., that the American Locomotive Company, or new interests, will continue the motor truck end of the Alco business. As has been announced the company has found its automobile department unprofitable and has discontinued it, except for the manufacture of repair parts for a period of years. The Alco truck is believed to promise a profitable business, and negotiations are said to be in progress with a view to continuing their manufacture. In machinery circles speculation is rife as to what disposal will be made of the automobile factory equipment which comprises a great amount of high-class metal-working machinery.

The Walker Chain Tire Company has established its business at the factory of the Smith & Egge Company,

Bridgeport, Conn., and will manufacture a new type of anti-skid automobile tire chain, consisting of solid links and a patented lock, the invention of Charles Smith of the Smith & Egge Company.

The Sleeper & Hartley Company, 98 Beacon street, Worcester, Mass., has brought out a new straightening and bundling machine which prepares music or piano wire for automatic feeding to spring-making and other wire-forming machines.

The Commonwealth Ice & Storage Company, Boston, Mass., will build a cold storage and power plant on Pier 6, Northern avenue, eight stories high, to cost $300,000.

The Mount Carmel Brass Foundry Works, Inc., Hamden, Conn., has been incorporated under a Connecticut charter, with Raffaele Biondi as president and Albert Pfeiffer as secretary and treasurer.

The National Automatic Machine Company, Brattleboro, Vt., has been organized with C. E. Skerry as president and general manager, J. R. Ryder secretary and treasurer, and a board of directors consisting of President Skerry, Dennison Cowles of Robbins & Cowles, F. A. Roberts of F. A. Roberts & Co. and John F. Linder of Linder & Meyer, Boston. The company has purchased the assets, contracts, good-will and patent rights of the National Envelope Sealing & Stamping Machine Company, Providence, R. I., which as one branch of the business will continue to manufacture sealing and stamping machines as well as conducting a general machine shop, making models, machines, tools, jigs, etc., for other people. The plant comprises a three-story building 70 x 100 ft., equipped with modern machinery, chiefly Brown & Sharpe, arranged in gangs and operated by electric motors.

Additions to general manufacturing facilities in New England include a large shoe shop at Lynn, Mass., for the A. S. Little Company and a three-story mill for the Fabyan Woolen Company, Medway, Mass.

Among old material to be sold at the Navy Yard, Boston, Mass., condemned as unfit for use therein, are generators, pumps, engines, boilers, hand tools, machine tools, brass pipe, scrap iron and steel, etc. Sealed proposals will be opened at 12 o'clock noon, October 10. Schedules containing form of proposals and terms of sale can be obtained upon application to the general storekeeper, Navy Yard, Boston, Mass.

Philadelphia

PHILADELPHIA, PA., September 22, 1913.

On the average September business has fallen below that for the same period last month. Really large business is not in evidence, and the demand for even small groups of tools is light. Merchants find little free inquiry, the bulk of the business under negotiation being due to active canvassing. Sales are scattered and confined closely to medium and small standard type equipment. In some lines of special tools a fair volume of business is moving. Railroad orders are light. Second-hand machinery, reflecting the general condition of the market for new equipment, is dull. Power equipment continues in good demand. There has been very little movement in the export trade. The majority of the steel casting plants are running considerably below capacity, but a fairly good volume of business is reported by general gray-iron foundries.

Irwin & Leighton have been awarded the contract for the erection of a nine-story brick, steel and concrete garage and service building, 232 x 320 ft., to be built for the Ford Motor Company, at Broad street and Lehigh avenue, from plans by Albert Kahn, Detroit, Mich.

The Philadelphia Iron Works, 412 North Eighteenth street, this city, manufacturer of boilers, tanks, etc., has been declared a bankrupt. Andrew Wheeler has been appointed receiver. Plans are under way looking toward the reorganization, its failure being reported due to insufficient working capital. James Thompson is proprietor.

Jacoby & Weishampel, architects, Allentown, Pa., have prepared plans for a 50 x 150 ft. addition, two stories, to the silk mill of the Wahneta Silk Company, Catasauqua, Pa.

The Kerk-Matlack Metals Company has been incorporated with a capital stock of $6000. C. E. Kerk, Wayne, Pa.; J. B. Matlack, Malvern, Pa., and John H. Nash, Philadelphia, are named as incorporators. While details as to the company's business are not available it is understood that it will open an office in the Real Estate Trust Building, Philadelphia.

William H. Dechaut, Baer Building, Reading, Pa., is said to be preparing plans and specifications for a pumping station to be erected for the Sunbury Water Company, Sunbury, Pa. Details are not yet obtainable.

The plant, comprising land, buildings and a large amount of equipment, including steam hammers, forging and machine shop equipment, of the A. P. Witteman Company, Chester, Pa., will be sold at receivers' sale at the plant on October 15. Samuel D. Clyde and C. A. Allison are the receivers.

The T. Robert Jenkins Brass Company, Baltimore, Md., is understood to be planning for a 36 x 70 ft. addition to its present plant, 527-529 Colvin street, which will be used as an extension to its foundry.

Plans have been prepared for a three-story brick garage and stable to be erected at 218-220 West Mulberry street, Baltimore, Md., for Aaron Strauss.

Bids will be received, it is stated, until October 24 by the City Commissioners of Trenton, N. J., for furnishing and installing pumping equipment in the Trenton filtration plant. Information may be obtained from Frank Thompson, city clerk. Johnson & Fuller, New York, are consulting engineers.

The report that William Sellers & Co., Inc., would begin operations at an early date on their proposed new foundry and machine shop at Folsom, Pa., is denied. Plans for the proposed buildings have been practically completed, but the decision to build has not yet been made and it may be some time until construction work is started.

Cleveland

CLEVELAND, OHIO, September 23, 1913.

Considerable improvement in inquiries is observed, but orders are still light. Business in prospect, however, makes the outlook more promising than for sometime. One new northern Ohio inquiry is for about 15 tools and others have come out for four or five machines. Second-hand machinery is quiet. Manufacturing plants in metal working lines generally report conditions satisfactory and most plants are running at full capacity. In the foundry trade the demand for small gray-iron castings continues heavy, but there has been some falling off in the demand for large castings. The demand for steel castings is active.

The F. & G. Machine Company is the name of a new concern which has established a plant in the Richardson Building, 224 High avenue, Cleveland, for making jigs, tools and dies, and doing experimental and repair work.

The Lake Erie Forging Company, Cleveland, is enlarging its plant by the erection of a 50 x 50 ft. addition and is installing an additional 3-ton hammer.

The American Range & Foundry Company, Cleveland, will shortly enlarge its plant by the erection of an addition, 48 x 95 ft. This company has discontinued the manufacture of stoves and is now engaged strictly in a jobbing foundry business.

The Eberhard Mfg. Company, Cleveland, will enlarge its plant by the erection of a two-story brick addition, 45 x 125 ft. The first floor will be used for nickel plating and for storage, and the second floor will contain the buffing and polishing rooms.

The name of the Brennan-Smyth Steel Company, Cleveland, has been changed to the Brennan Steel Casting Company. M. M. Smyth has sold his interest and severed his connection with the company. Extensions to the foundry plant will shortly be built. These will include the two buildings, one 75 x 100 ft., and the other 75 x 250 ft. The company will install a power plant and considerable new equipment, including molding machines and sand blast and grinding machinery equipment.

A manufacturing plant will be erected in Toledo, Ohio, by the Sterling Seal & Cork Company. W. J. Walding is president and E. P. Wetmore is general manager.

The Cleveland Cooperage Company will enlarge its plant by the erection of an addition, 79 x 138 ft., of brick and steel construction.

The American Lawn Tool Company, Canton, Ohio, has increased its capitalization from $10,000 to $30,000 to provide for the building of an addition to its plant. H. D. Sommers is president of the company and D. S. Sommers is general manager.

A municipal lighting plant will be established in Oak Harbor, Ohio. The voters at a special election have approved a bond issue of $20,000 for that purpose.

The general contract for the car repair shops to be built on the Lake Shore Railroad at Air Line Junction, near Toledo, has been awarded to the Bentley & Sons Company, Toledo. The shops will comprise a group of

12 buildings, the largest covering a ground space of 200 x 200 ft.

The Peerless Drawn Steel Company, Massillon, Ohio, has been incorporated with a capital stock of $100,000 by J. G. Lester, F. H. Snyder, Wm. A. Sonnhalter, N. W. Culbertson, and F. W. Arnold. The company will occupy the former plant of the Massillon Bridge & Construction Company, but is not ready to announce further plans.

The A. D. Baker Engineering Company, Swanton, Ohio, maker of traction engines, has commenced the erection of an addition to its plant, 60 x 100 ft.

The plant of the Pilliod Lumber Company, Swanton, Ohio, manufacturer of carpenters' tool chests, was burned September 12, the loss being about $20,000.

The Central South

LOUISVILLE, KY., September 22, 1913.

While the trade situation has quieted down a bit enough business is still in evidence to result in general satisfaction on the part of the machinery houses. A good demand for boilers is reported, but electrical power equipment is not in as good demand as heretofore, though manufacturers report that motor-driven machine tools are selling well. Machine tools for automobile repair shops constitute another important item in this territory. Makers of refrigerating equipment are looking forward to a big 1914 season, present orders and prospective business being excellent.

The Imperial Wire & Iron Works, Louisville, has purchased a Toledo electric welder through the James Clark, Jr., Electric Company, Louisville. Final details as to the new plant of the Imperial Wire & Iron Works will be ready in about ten days.

The Henry Vogt Machine Company, Louisville, has had plans drawn for remodeling and enlarging its office building, the growth of the business having been such as to require additional room.

The Norman Lumber Company, Louisville, will purchase a boiler for installation at its sawmill at Holly Ridge, La., to be used in connection with a "preparator" by means of which lumber is seasoned by steam under pressure.

Peter Jacobson & Sons, New Albany, Ind., have been given a site by the chamber of commerce on which to erect a furniture factory. Its plant was recently damaged by fire.

The Crown Laundry, Louisville, is building a reinforced concrete addition to be used as a repair shop for the fleet of automobile trucks which it uses. Some machine tools for this work will probably be needed. Address Harry Haas.

The Cloverport Bolt & Machine Company, Cloverport, Ky., will erect a new plant. An iron foundry is included in the present plans of the company.

The H. E. Heimberger Veneer & Lumber Company, New Albany, Ind., has acquired a site for a lumber manufacturing plant, and will install general sawmill equipment as well as equipment for veneer manufacture. Harry E. Heimberger is in charge of the company's operations.

The Looney's Creek Coal Company, Barbourville, Ky., has leased a mining tract in Harlan County and will be in the market for the necessary equipment in the immediate future.

The New Century Hotel Company, Paducah, Ky., is in the market for electric lighting equipment, the estimated cost of which is $7500. F. M. Fisher is president of the company. The hotel will be established at Dawson Springs, Ky.

James Breathitt, Jr., Hopkinsville, Ky., is the chief mover in the project to build a traction line from Madisonville to Nortonville, Ky. The plan involves the purchase and expansion of the municipal lighting plant at Madisonville. It is announced that a New York firm is to finance the project.

W. J. Bebaun, Perryville, Ky., is proceeding with the work of enlarging the capacity of his electric light and ice plant.

The plant of the Bardwell Canning Company, Bardwell, Ky., was burned last week with $10,000 loss. Rebuilding plans will be taken up shortly.

The Fulton Electric Light & Power Company, Fulton, Ky., is enlarging its plant and plans to increase the capacity from 100 hp. to 250 hp.

Carlisle, Ky., is considering plans for the establishment of a water system. The City Council is arranging for preliminary estimates to be made, following which a bond issue will be voted on.

The name of the firm which will build an ice plant at Cerulean, Ky., is reported to be Rawls, Atwood & Co. Construction will begin early next spring.

Marion, Ky., is considering the issue of $25,000 of bonds for the purpose of establishing a waterworks system. The proposed issue will be voted on at the November election.

John Strange, W. G. Witherspoon and Joseph Hawkins, Lawrenceburg, Ky., are preparing to begin the construction of an automobile garage, which will be equipped with a repair shop of considerable size.

T. H. Davies, Hawesville, Ky., is planning to equip a building which was recently leased for the manufacture of dimension lumber. Saw and planing mill equipment will be needed.

Louis D. Baer, Owensboro, Ky., will build a garage. Plans for the building include a repair shop.

The fiscal court of Trimble County, at Bedford, Ky., is to purchase a considerable amount of road construction equipment. Address Judge I. T. Stanley.

The Louisville & Nashville Railroad Company, with general offices in Louisville, is considering the location of large shops at Paris, Ky.

The Wright Motor Car Company, Ashland, Ky., is enlarging its garage and repair shop.

The Jefferson County pike commission, with headquarters at Dandridge, Tenn., is in the market for the necessary equipment for the grading of about 35 miles of road. Arthur Holtsinger is secretary.

The Old Sol Hot Air Furnace Company, Nashville, Tenn., has been organized to manufacture heating equipment. J. D. Tipple is president.

The Chester Motor Car Company, Nashville, Tenn., has begun the construction of a garage. Machine tools will be needed for the repair shop, which will be unusually large.

The sawmill and planing mill of Joseph Gunn, Rutledge Falls, near Ovoca, Tenn., were destroyed by fire with a loss of about $10,000.

Henry Nyberg, an automobile manufacturer with plants in Chattanooga, Tenn., and Anderson, Ind., is planning the concentration of the manufacturing department of the business in the former city. A reorganization of the company, looking to the enlargement of the business, is now being arranged.

The Holston Mfg. Company, Lenoir City, Tenn., will need electric motors for the operation of a branch mill at Morristown, Tenn., the construction of which has been begun.

Winnsboro, S. C., is contemplating a bond issue of $65,000 for the purpose of establishing a water system.

Cincinnati

CINCINNATI, OHIO, September 22, 1913.

Although a slight improvement in the machine tool business is apparent, it does not seem to be general, and scattered orders only are reported. The export trade appears to be taking on a little more life, but it is yet behind expectations. The railroads are not now buying heavily, but there are a number of lists that have been made up for over a year that may figure in this year's business. Electrical equipment is in better demand, as far as the smaller units are concerned, but only a few large contracts are in sight in this territory. Second-hand machinery is dull, which some dealers state is rather out of the ordinary for the season. In other lines of business there has been a decided improvement. Wholesale hardware dealers report reviving trade conditions, and practically all of them expect a busy fall.

The board of hospital commissioners, city of Cincinnati, will open bids October 10 for a number of boiler feed pumps, hot water circulating pumps, high pressure piping and fittings and several air compressors. E. L. Kennedy is clerk of the board.

The Cincinnati Precision Lathe Company, Cincinnati, has increased its capital stock from $50,000 to $75,000. No additional equipment will be required.

The Jenkins Graphite Company, Cincinnati, has been incorporated with $100,000 capital stock, by Samuel M. Jenkins, William J. McCauley and others. The new company expects to establish a plant for the manufacture of lubricants.

The Cincinnati Stamping Company, Cincinnati, has increased its capital stock from $75,000 to $100,000. No additions to its plant are proposed.

The municipality of Orville, Ohio, will soon call for bids for an electric lighting plant. E. P. Williams is mayor.

It is rumored that the municipality of Mansfield, Ohio, contemplates building a large electric lighting and power plant. No details are yet available.

The American Rolling Mill Company, Middletown, Ohio, has recently placed an order with the Hooven-Owens-Rentschler Company, Hamilton, Ohio, for a Corliss engine to develop 1800 hp.

The village of New Bremen, Ohio, is advertising for bids on one 75-hp., high speed non-condensing steam engine, one 75-hp. gas engine and one 75-hp. oil engine. Bids will be opened October 6 by E. R. Haines, council clerk.

It is currently reported that the Pattin Brothers Company, Marietta, Ohio, manufacturer of gas engines and well drilling machinery, contemplates building a large manufacturing plant and foundry on a site recently secured in the eastern section of the city.

The Columbus Dental Mfg. Company, Columbus, Ohio, is receiving bids for a two-story addition to its plant. Machinery requirements will be limited to a few small special tools.

The city of Dayton, Ohio, will soon ask for bids on a large pump to be installed in the waterworks plant.

The White River Creamery Company, Muncie, Ind., will open a branch plant in Cincinnati at 905-907 Broadway. Included in the necessary equipment is a 10-ton ice and refrigerating plant.

Detroit

DETROIT, MICH., September 22, 1913.

The run of business the past week has been encouraging to dealers; orders have come in at a steady rate and the volume of inquiries is pleasing. In some lines of special machinery such as laundry equipment and woodworking machinery there is a good demand. A fair volume of business in power plant equipment is before the trade. Manufacturing machinists and tool and die makers report a general betterment in conditions and that more orders are being booked now than for some time. Foundries are operating on an even basis with improvement in orders noted in some instances. The second-hand machinery market is comparatively dull. Builders have plenty of work but no new propositions of magnitude are being figured on.

The Michigan Steel Boat Company, Detroit, has taken out a building permit covering the erection of a four-story cement block factory building, 56 x 400 ft., to cost $25,000. The new building will adjoin the company's present plant at 1250 East Jefferson avenue.

The Joseph Mack Printing Company, Detroit, is having plans prepared for a new four-story plant for which some miscellaneous equipment will be required later.

The Metal Parts Engineering Company, Detroit, has been incorporated with $25,000 capital stock to manufacture automobile parts and accessories by William L. Kenfield, William McIntyre and John Faust.

The Michigan Pattern Works, Detroit, has completed its new plant at 1085-89 Jefferson avenue. The new building is 62 x 120 ft. and will enable the company to double its present output.

The Hupp Motor Car Company, Detroit, has filed amended articles of incorporation increasing its capital stock from $750,000 to $1,000,000.

The plant of the John W. Marr Cooperage Company, Detroit, was destroyed by fire September 13, with a loss of $10,000.

The Security Trust Company, receiver of the R-C-H Corporation, Detroit, automobile manufacturer, has been authorized by the creditors to dispose of the business. The plant will be continued in operation pending its sale.

Gregory, Mayer & Thom, Detroit, office outfitters, have awarded contracts for the erection of their nine-story commercial building and bindery. The building will be of steel and concrete construction.

The No. 2 plant of the Hess Spring & Axle Works, Pontiac, Mich., was damaged by fire September 14 to the extent of $5000. The burned portion will be immediately rebuilt.

It is announced that the International Milk Products Company of Detroit, recently organized with a capital stock of $100,000, will establish a plant at Bad Axe, Mich. The company proposes to erect and equip several buildings representing an investment of $35,000.

The Goshen Shirt Mfg. Company, Manistee, Mich., has outgrown its present plant and will build an addition to cost $10,000.

The taxpayers of Morenci, Mich., have voted $10,000 bonds for the construction of a waterworks system.

The Van's Harbor Lumber & Land Company is contemplating the establishment of a large lumber mill at Ironwood, Mich.

The Page Fence Company, Adrian, Mich., is preparing to establish a department for the manufacture of windshields and is now purchasing the necessary equipment. E. K. Conover is in charge of the new department.

Chicago

CHICAGO, ILL., September 22, 1913.

The burning of the Nickel Plate Railroad shops at Chicago, which was reported last week, was followed by the immediate placing of orders for about eight or ten general tools, including lathe, planer, shaper and drill press to meet the immediate requirements. Additional buying will be necessary when the plans for reorganizing the shop are matured. Other prospective railroad buying, including inquiries from the Chicago & Northwestern, the Chicago, Rock Island & Pacific, the St. Paul and the Lake Shore, is still in abeyance. General buying, while somewhat improved, is still below normal, and the inquiry pending does not hold out promise of substantial increase in activity in the immediate future.

The Pyott Foundry Company, Chicago, whose recent purchase of property at West Lake and North Forty-sixth streets has been noted, has organized the Pyott Sand & Gravel Company which will occupy this property for storage purposes, handling the output of a sand and gravel pit recently acquired. The new foundry building, which ultimately will occupy a portion of this site, will cost in the neighborhood of $200,000.

Johnston & Chapman, Chicago, will erect at Carroll and Sacramento avenues, a one-story factory, 50 x 150 ft., to cost $12,000.

The Taylor Portable Steel Derrick Company, Chicago, has been organized with a capital of $35,000, to deal in derricks and handling tackle, by John L. Taylor, who has manufactured this product under his own name at 1034 West Lake street.

The Standard Auger Company, Chicago, has been incorporated with $10,000 capital, by Orson R. Watson, Albert Isaacson and William J. Curtis, to manufacture and deal in augers.

The Henes Sales Corporation, Chicago, has been incorporated by Henry W. Henes, A. C. Jones and K. L. Shanley, to deal in tools and machinery.

William J. Garret has taken out a permit to erect a one-story brick factory, 100 x 100 ft., at 1732 Arcade place, Chicago, at a cost of $8000.

The Rock Island Mfg. Company, Rock Island, Ill., has enlarged its plant to provide facilities for a vise manufacturing department.

The contract has been let for an addition, 85 x 100 ft., to Deere & Mansur's foundry at Moline, Ill., to P. H. Lorenz. The new building will be of saw-tooth construction and will cost $25,000.

Plans are being drawn for a 30 x 120 ft., four-story addition to the Waterloo Saddlery Company's factory, Waterloo, Iowa, to cost $15,000.

The city of Knoxville, Iowa, has issued $70,000 bonds for remodeling the city waterworks system.

The contract has been awarded to W. D. Lowell, of Minneapolis, for a new waterworks system at Carrington, N. D., at a cost of $27,000.

The Minnesota Radiator Company, Duluth, Minn., recently organized, has purchased the plant and equipment of the Northwestern Radiator Company at Sauk Centre, Minn. The equipment will be removed as soon as buildings to be erected at West Duluth at a cost of $25,000 are completed.

The Fairbury Ice & Cold Storage Company, Fairbury, Neb., has been organized and will build a plant for the manufacture of ice and cold storage apparatus at a cost of $30,000.

Milwaukee

MILWAUKEE, WIS., September 22, 1913.

The machinery trade is quiet. New business is confined almost wholly to single orders, and even these are none too numerous. The milling machine trade is holding up well and production is still considerably above normal. Collections are reported to be somewhat improved, although not satisfactory. Labor is plentiful.

The transfer of the administrative department of the Chicago works of the Allis-Chalmers Mfg. Company to the main works at West Allis, Wis., will take place October 4, and about 150 people will be involved. The removal of the operating departments from Chicago to West Allis is planned for December 15, at which time it is expected that the new buildings now under con-

struction will be ready for occupancy. The changes involve principally the mining machinery business. The new buildings are a boiler and flange shop and a perforation shop.

The Milwaukee Athletic Club, Wells Building, Milwaukee, is planning the erection of a brick and steel structure costing about $500,000, on a site costing $100,000, at Michigan and Milwaukee streets. The site is 120 ft. square. Guy F. Greeg is president and chairman of the building committee.

The Milwaukee County Board of Supervisors is arranging for an immediate execution of the new house of correction building project, involving $700,000, under an order from the State Board of Control that a new house of correction must be provided before October 1, 1914. Plans have been prepared by Leenhouts & Guthrie, architects, Milwaukee. Power machinery and electrical equipment will be required. Oscar E. Schwemer is chairman of the county board.

The Suburban Garage Company, Wauwatosa, Wis., has been organized with $11,000 capital stock by A. D. Warren, P. G. Warren and D. A. Krienitz, and will equip an automobile garage, including a custom repair shop.

The Northern Floor Surfacer Company, Green Bay, Wis., manufacturer of power-driven machines for polishing terrazzo and composition floors, is preparing to market several additional lines and contemplates making extensions early next year. The motors for the machines are supplied by the H. J. Nelson Machine Company, Green Bay.

The Feval Enamel Insulated Wire Company, of Chicago, has started negotiations with several manufacturing cities in southern Wisconsin and northern Illinois with a view to moving its plant to a smaller town with good shipping facilities. The company was organized three years ago and employs 50 men. Business men's associations at Beloit, Janesville, Kenosha and Racine, are trying to secure the plant.

The C. Reiss Coal Company, Sheboygan, Wis., has awarded a contract for two 150-hp. boilers for its coal docks at Escanaba, Mich., to the Optenberg Iron Works, Sheboygan.

The Milwaukee Concrete Mixer & Machinery Company, Milwaukee, which recently increased its capital stock and changed its corporate name, does not contemplate any extensive additions to its plant or shop equipment. The additional issue is made to enlarge the working funds.

Wheeling

WHEELING, W. VA., September 22, 1913.

The Thatcher-Whittemore Glass Company, St. Louis, Mo., and Brussels, Belgium, will relocate its plants at Wheeling. It will purchase new equipment and enlarge its output. The company manufactures high-grade camera plate glass.

P. E. Burt, proprietor of the West Lafayette Enameling Works, West Lafayette, Ohio, will establish a similar plant at Huntington, W. Va., to manufacture enameled steel signs, kitchenware, reflectors and enameled steel products. The new plant and machinery will represent an expenditure of $27,000.

The Magnolia Power Company, Cumberland, Md., proposes to construct a hydroelectric plant developing 13,000 hp. at Springfield, W. Va. It plans to transmit electricity to Cumberland, Springfield, Romney and other points in West Virginia. F. Ernest Brackett, Cumberland, Md., is the engineer.

The Deegans Coal Company, Mann, Logan County, W. Va., has been incorporated with $25,000 capital stock by W. E. Deegans, Mt. Hope, W. Va.; Thomas F. Bailey, Jr., and others, of Huntington, W. Va.

The Panther Coal Company, Welch, W. Va., has been incorporated with $150,000 capital by William Leckie, A. E. Jennings, S. J. Kell and others.

The plant of the Columbia Tile Company at Grafton, W. Va., valued at $100,000, was destroyed by fire. It will be rebuilt.

The Nut Lock Mfg. Company, Charleston, W. Va., has been incorporated with $50,000 capital stock by F. H. Fellows, Middleport, Ohio; E. C. B. Moore, Ernest Moore and others, of Charleston, W. Va.

The Lost Creek Lumber Company, Romney, W. Va., has been incorporated with $150,000 capital stock by W. B. Cornwell, John J. Cornwell and others, of Romney, W. Va.

The Thompson Garage Company, Clarksburg, W. Va., will soon call for bids on an addition to its present building. It is understood that a small repair shop will be operated in connection with its garage.

S. Jarrett, J. H. Davis, Omer Given and others, of Clendenin, W. Va., and R. W. Snyder, Queen Shoals, W. Va., have organized a company with a capital stock of $20,000 to manufacture ice and operate cold storage plants.

The Nicolette Canning Company, Nicolette, Wood County, W. Va., has been incorporated with $16,000 capital stock by H. R. McCluer, James S. McCluer, of Parkersburg, W. Va.; H. E. Dawson, Nicolette, W. Va., and others.

The new plant of the Wheeling Sheet & Tin Plate Company, at Yorkville, a short distance above Martins Ferry, Ohio, will begin operations about October 15. The machinery is being rapidly installed and will be tested early in the month.

The Fletcher Enamel Company, Anderson, Ind., will build a new factory at Charleston, W. Va.

Harman H. Mullins, Clintwood, Va., is planning the installation of an electric light plant, it is reported.

The Adams Lumber Company, Charleston, W. Va., has been incorporated with $50,000 capital stock by R. S. Spilman, H. B. Smith, C. L. McFarland, Duke W. Hill, B. M. Price; all of Charleston.

The Ajax Coal Company, Fayetteville, W. Va., has been incorporated with $100,000 capital stock by S. M. Dunbar, Pittsburgh, Pa.; J. P. Chapman, Beury, W. Va.; J. T. McMaster, East Bank, W. Va.; J. J. Christie, Lookout, Ky., and Timothy Ewing, Fayetteville.

St. Louis

ST. LOUIS, MO., September 22, 1913.

Business in the machine tool market is continuing to improve. The inquiry which is coming in is quite general. A better feeling is reported throughout the St. Louis territory, as a casting up of accounts shows that the drought damage has not been so overwhelming as early reports indicated, while the seasonable fall weather accompanied by rains is having a revivifying effect on commercial spirits. Second-hand tools are in some request. Collections are reported fair.

The Bourne-Fuller Steel Company, St. Louis, has been incorporated with a capital stock of $25,000 by Charles H. Fenner, Cornelius J. Sullivan and John C. Barrows to manufacture iron and steel work, etc.

The Kremer & Voirol Construction Company, St. Louis, has been awarded a contract to install new heating, lighting, ventilating and elevator systems in the Southern Hotel at St. Louis at a total cost of about $100,000.

The Mar-Kay Mfg. Company, St. Louis, has increased its capital stock for the purpose of increasing its manufacturing equipment.

J. Dougherty, 3900 Washington avenue, St. Louis, will remodel his machine shop equipment at a cost of about $5000.

The Perfection Blower Company, St. Louis, has been incorporated with a capital stock of $16,250 by Henry J. Boodges, H. J. Saller and Emil Schraz to manufacture blowers and similar apparatus.

The Harvard Mfg. Company, East St. Louis, Ill., has been organized to deal in machinery, etc. Eugene F. Cook, Francis Kirsch and Herman F. Haarstick are the incorporators.

The Auto Salvage Company, Kansas City, Mo., has been incorporated with a capital stock of $15,000 by Claude S. and B. G. Peck and W. R. Chamberlain to equip a shop for the repair and rebuilding of automobiles.

The Public Service Commission of the State of Missouri has granted permission to the city of Hannibal to take over the privately owned waterworks plant, and the city will proceed to expend about $60,000 in the improvement of the plant's equipment.

The city authorities of Jefferson City, Mo., have taken up the matter of the installation of a municipally owned electric lighting plant and has employed R. L. Baldwin, of Kansas City, Mo., to prepare plans and estimates.

The city of Ava, Mo., has granted a franchise for an electric light and power plant to J. W. Pettit & Co., who will install equipment to cost about $10,000.

The Kearney Electric Light Company, Kearney, Mo., will put in equipment to cost about $5000. L. Major is manager.

The city of Marcelline, Mo., will make an addition to its electric light plant, including boilers, feed water heater, two Corliss engines and a boiler feed pump. L. A. Nickell is superintendent.

The Reader electric light plant at Pleasant Hill, Mo., will be transferred to a syndicate represented by E. H. Crow, of St. Louis. The new owners will expend about $75,000 for the plant and improvements in the equipment.

The Burlington Junction Ice Company, Burlington Junction, Mo., will install equipment for an additional 10 tons daily capacity and is in the market for the machinery needed. L. Monk is manager.

The Federal Fruit & Cold Storage Company, New Orleans, La., has plans for the establishment of a cold storage plant at Macon, Mo., and is reported in the market for the necessary equipment.

An ice plant with a capacity of 25 tons daily will be equipped at Slater, Mo., by G. A. Heller and W. T. Nock. Robert M. McCandlish, of Kansas City, Mo., is the engineer.

The Dallas Mining Company, Carl Junction, Mo., has been incorporated with a capital stock of $50,000 by A. D. Shockley, of Cincinnati, Ohio; W. C. Taylor, of Carl Junction, and others, who will install electrical equipment to operate a concentrating mill which has been acquired and will also add considerably more machinery.

The Portland Lead & Zinc Company, of Joplin, Mo., has plans for the construction of a 300-ton concentrating mill at once.

The Automatic Train Control Company, Kansas City, Mo., has been organized with a capital stock of $2,000,000 by Carl Woods, E. E. Hairgrove and C. D. Dall to manufacture an automatic device for the control of trains and the prevention of accidents on steam roads.

The Niangua Heights Development Company, Linn Creek, Mo., has completed plans for the construction and equipment of a hydroelectric plant of 300 hp. capacity and is in the market for the necessary equipment, including turbine wheel, dynamo, etc.

Under the direction of C. H. Sexton, city engineer, Neosho, Mo., about $60,000 will be expended for the improvement of the equipment of the waterworks plant, etc.

The Pontiac Motor Car Company, Pontiac, Ill., has been incorporated with a capital stock of $35,000 by I. A. Morrison, C. F. Taylor and E. Hoobler to equip a repair shop, garage and motor manufacturing plant.

The plant of the Wood River works of the Standard Oil Company, Wood River, Ill., is to be increased in capacity by the addition of 20 new stills for the manufacture of the new motor spirit.

The Maher Engineering Company, Monmouth, Ill., has been incorporated with a capital stock of $15,000 by John C. Maher, H. C. Lightner and John J. Ryan and will equip shops.

The Missouri & North Arkansas Railroad Company will expend about $30,000 for a new freight depot and roundhouse at Heber Springs, Ark.

The Citizens Electric Company, Hot Springs, Ark., will rebuild at once the large electric light and power plant recently burned. C. C. Chapelle, of 60 Broadway, New York, will be in charge of the rebuilding.

The H. H. DeWitt Lumber Company, Little Rock, Ark., has been incorporated with a capital stock of $100,000 by H. H. DeWitt, C. P. Simon and S. E. Wilkin and will install mill plants at once.

The Coulson Lumber Company, Little Rock, Ark., has been incorporated with a capital stock of $40,000 by W. N. Coulson, B. C. Sweeney and others, and will equip a mill.

H. Tysinger, of Little Rock, Ark., will equip a large garage for automobiles, including a repair shop.

The Herron Mining Company, of Coalton, Okla., is reported to be in the market for mining machinery, including an electric hoist.

The city of Oklahoma City, Okla., has plans for the immediate installation of additional waterworks capacity in the pumping station of about 3,000,000 gal. daily capacity.

The waterworks commission of Eureka Springs, Ark., has decided upon plans involving the expenditure of $100,000 to $150,000 in the extension of the water plant equipment and pumping capacity.

The Oklahoma Hosiery Company, Oklahoma City, Okla., recently incorporated by T. H. Lindley and others with a capital stock of $25,000, will install 100 automatic knitters.

The Lanyon Cone & Mfg. Company, Oklahoma City, Okla., will enlarge the capacity of its plant for the manufacture of ice cream cones and will install at least nine additional machines. A new company with $300,000 capital is to be organized to further enlarge the plant.

The Oklahoma Electric Chemical Company, Hugo, Okla., has been incorporated with a capital stock of $25,000 by J. T. Crow, J. J. McIntyre and others, and will equip a plant for the manufacture of metal polishes, etc.

The Checotah Water, Light & Ice Company, Checotah, Okla., will add to its equipment a large steam laundry and is in the market for the equipment.

The Wilson Lumber Company will rebuild and re-equip the large lumber mill which was recently destroyed by fire at Bokoma, Okla., including a sawmill, waterworks, light plant, kiln, etc.

The Archer Oil Company, Pryor, Okla., which has been proving its land, has decided upon the installation of necessary equipment for its development and is in the market for the machinery.

The Cushing Gasoline Company, Cushing, Okla., has been incorporated with a capital stock of $200,000 by Ray B. Jones and C. F. Hillman, of Cushing, and Frank Brown, of Independence, Kan., and will equip a plant for the manufacture of gasoline, etc.

An electric light plant will be equipped for municipal operation by the city of Chelsea, Okla. Address J. L. Jones, city clerk.

The Evansville Gin Company, Evansville, Miss., which has a capital stock of $13,500, will install an equipment of three 70-saw gins and other machinery. Burch Williams is president.

The Caldwell Cotton Oil Company, Vicksburg, Miss., has been incorporated with a capital stock of $10,000 by J. C. Caldwell, H. S. McChesky and others, and will equip an oil compressing plant to handle cotton seed.

J. A. Hawkinson, A. L. Hopkins and others, of Chicago, Ill., have bought the packing plant at Natchez, Miss., and have plans for the expenditure of about $100,000 in new equipment.

The city of Ville Platte, La., has authorized bonds for the construction of municipal waterworks. W. B. Roberts is consulting engineer.

The Raleigh Company, New Orleans, La., has plans for the immediate construction of a distillery of considerable size. Frank Einstein, Louis Chaplain and others are interested.

A grain elevator and corn-shelling plant will be equipped at Thibodaux, La., by the Percy-Lobdell Company, which is seeking equipment.

The Brandin Slate Company, New Orleans, La., has been organized with a capital stock of $10,000 by John J. Prendergast, Albert Brandin and others, and will equip a slate quarry plant.

T. P. Singletary, Baton Rouge, La., has plans for the establishment of a $100,000 plant for the recovery of sand and gravel from the Amite River for building and other purposes.

The Owl Bayou Cypress Company, of Strader, La., whose plant was recently burned with a loss of $48,000, will rebuild and re-equip its mill.

The Ollie Cypress Company, of New Orleans, La., has been incorporated with a capital stock of $30,000 by W. S. Bender, J. T. Orillion and T. M. Cotten to equip a mill.

The city of Welsh, La., has formally decided upon the expenditure of $15,000 for a municipal electric light plant and is seeking the necessary machinery.

The Planters Cotton Oil Company, Nachitoches, La., which has been incorporated with a capital stock of $50,000 by Morris Aaron and others, bought the Grand Ecore plant and will improve and add to its equipment.

Birmingham

BIRMINGHAM, ALA., September 22, 1913.

The inrush of new cotton has stimulated trade throughout Alabama and adjoining states, with the result that all lines, including the machinery trade, feel an uplift. The volume of business appears to be on the gradual increase with each week.

The Caruthers-Irwin Shoe Company announces that it will build a shoe factory in Birmingham to cost $200,000. Ewing Caruthers and Walter H. Irwin, Birmingham, are at the head of the enterprise.

The Garlock Packing Company, Palmyra, N. Y., will move its New Orleans factory to Birmingham, it is stated. Warehouse facilities have been already obtained. Packing machinery is manufactured.

R. C. Middleton and associates of Birmingham have acquired the properties of the De Soto Mining & Development Company, including 3200 acres of coal land and mines near Birmingham. Improvements are understood to be in contemplation.

Hugger Bros., Montgomery, Ala., have a contract for erecting a $100,000 fertilizer plant for Morris Bros. of that city.

Frank Gibhart will establish a factory for grinding sugar cane at Seminole, Ala.

The American Wood Waste Company, Geneva, Ala., has been incorporated with a capital stock of $100,000 to establish a plant for manufacturing articles out of wood waste by George A. Gindele, Thomas A. Dungan and others.

The city of Huntsville, Ala., contemplates the estab-

lishment of an abattoir. J. D. Humphreys is the chairman of the committee.

It is stated in an unauthorized way that the Tennessee Coal, Iron & Railroad Company will build a benzol plant at a cost of $1,500,000 adjacent to the by-product coke plant at Fairfield, near Ensley.

The Griffin Foundry & Mfg. Company, Rome, Ga., has been incorporated with a capital stock of $20,000 to establish an iron foundry and repair shop by M. N., W. S. and W. J. Griffin and R. E. George and associates.

The Standard Naval Stores Company, Savannah, Ga., has been incorporated with a capital stock of $500,000 to manufacture naval stores. J. F. C. Myers, C. J. De Loach and J. E. Driscoll are interested.

The Moultrie Packing Company, Moultrie, Ga., has been incorporated with a capital stock of $100,000 to establish a meat-packing plant by W. H. Barber, W. C. Vereen, Frank R. Pidcock and associates.

F. J. Powers has applied to the City Council of Homestead, Fla., for permission to establish an ice plant. He also asks for a franchise for an electric lighting plant.

Texas

AUSTIN, TEXAS, September 20, 1913.

The drouth which caused serious deterioration of the cotton crop in the last three weeks of August and first week of September has been completely broken by general and heavy rains. While the precipitation will not benefit the cotton to any great extent, it insures fine late forage and grass. It is also a stimulant to general business conditions. Fall trade is now opening up briskly in all lines. The demand for various kinds of machinery and tools promises to exceed that of last fall and dealers are naturally cheerful as to the prospect. One of the notable features of the trade is the unusually heavy demand for mining and irrigation machinery in Arizona.

The Brazos Tile & Brick Company is enlarging its tile manufacturing plant at Rosenberg.

An election of taxpayers will be held at Rosenberg, October 15, to vote on issuing $31,000 bonds for the construction of a waterworks plant and distributing system.

D. T. Austin and associates will rebuild the cotton gin at Velasco which was recently destroyed by fire.

Charles F. Hart & Son have applied to the City Council of Brownwood for a franchise for a proposed natural gas distributing system. They recently developed a large supply of gas near Brownwood.

The City Council of Brownwood has appointed a special committee to consider the construction of a municipal electric light plant.

The International Electric Company has entered into contracts with the Rio Grande Valley Land Company and Indio Cattle Company to supply electric power for operating a number of irrigation pumping plants on lands which those two companies are developing. The International Electric Company will construct a system of power transmission lines to points in the Eagle Pass section and to the ranches of the companies with which it has made contracts. It will enlarge its power station at Eagle Pass at a cost of about $55,000.

Pecos has voted to issue $35,000 bonds for the construction of a waterworks plant.

The Gilmer Compress & Warehouse Company will erect a cotton compress at Gilmer. W. G. Barnwell is interested.

The Dublin Gas & Electric Company will construct an electric power transmission line from Dublin to Hamilton. The company is also constructing a power transmission line from Dublin to Hico, a distance of 22 miles. In addition to these two lines it will erect a new central power station for the purpose of providing additional power for lines in contemplation.

The City Council of Belton has awarded the contract to H. L. Karnes & Son, of that place, for the construction of a new pumping station for the municipal water works plant.

The Texas Power & Light Company is installing new machinery in its electric light and power plant at Tyler. It will furnish power for operating the local street railroad system.

The City Council of Bangs has granted J. B. Snow and Charles Strange a franchise for the construction of a natural gas distributing system at Bangs. The gas supply will be obtained from a well situated about two and a half miles from that place and owned by the Neodosha Gas & Oil Company.

The Cameron Water & Light Company is preparing to supply the towns of Rosebud Springs, Burlington and Ben Arnold with water from its pumping plant situated on Little River. To carry out the project pipe lines six to eighteen miles long will be laid and additional pumping machinery installed.

Preparations are being made at Bloomington for the construction of a waterworks system and an electric light plant. The Commercial Club is promoting the projects.

The Municipal Water Board will purchase machinery for an auxiliary waterworks plant at Mesa, Ariz. The City Council of that place also has under consideration the purchase of the electric light plant of the Southside Gas & Electric Company.

The Three Rivers Irrigation Company has been organized for the purpose of constructing a system of irrigation in the valleys of the Santa Cruz and Rillito rivers in Arizona. It is proposed to reclaim about 10,000 acres of land. Besides the flood waters of these streams that will be used several wells will be bored and pumping plants installed. The company's offices are at Tucson.

Lafayette Myers will construct a fruit canning factory at Glendale, Ariz.

A syndicate of men from Bangor, Me., represented by J. Barton Nealy, has secured an option on the holdings of the Cataract Canyon Power Company, of Prescott, Ariz., and if the project is consummated a large hydroelectric plant will be constructed in Cataract Canyon, which, next to the Grand Canyon, is the greatest gorge in Arizona. The proposed plant will have a capacity of about 12,000 hp.

W. W. Jernigen is arranging to erect a flour mill near Weed, N. M.

The Standard Oil Company is preparing the site and doing other preliminary work toward the erection of a large oil refinery at a point on the Panuco River, about six miles below Tampico, Mexico. It is stated that more than $2,000,000 will be invested in the plant. The company will erect its own electric light and power plant, waterworks system and lay out a model town for its employees.

The Mexican Eagle Oil Company, which is constructing a large oil refinery at Tampico, Mexico, has also adopted plans for enlarging its refinery at Minatitlan, Coatzacoalcos, on the Isthmus of Tehuantepec, from 7000 bbl. daily to 10,000 bbl.

It is announced at Tampico, Mexico, that the Waters-Pierce Oil Company is having plans prepared for an addition which it will erect to its oil refinery at that place. The proposed improvement will cost, it is stated, more than $1,000,000.

The National Oil Company is constructing an oil pumping plant at Chijol, state of Vera Cruz, Mexico. It will also lay a system of pipe lines.

The Pacific Coast

SAN FRANCISCO, CAL., September 16, 1913.

With figuring completed on important Government requirements, and the vacation season about over, more attention is being given to the ordinary run of trade, and machine tool dealers report a very fair volume of small orders. There is also considerable figuring and an increasing amount of business definitely in prospect for fall, though no large movement is expected locally for the remainder of the year. In other lines purchases are still held down to as narrow limits as possible, though on the whole a decidedly better tendency appears than for two or three months. Contractors' equipment still receives less attention than last year, but a few substantial orders have lately been placed. Buyers of woodworking and logging machinery show some interest, and a period of active timber development in California is expected next year. Manufacturers of fruit canners' machinery have had a good season and are preparing for another next year. The demand for pumping machinery is well maintained, with considerable inquiry at present for waterworks equipment. A large demand for marine gas engines of comparatively high power is reported. The expected increase of marine traffic on the opening of the Panama Canal has brought great activity in the construction of towboats and barges, many of the latter being equipped with hoisting and cargo-handling machinery.

The San Francisco Board of Education has taken figures for installing a motor generator set in the Girls' High School.

C. F. Braun & Co. of this city have taken a contract to install a new centrifugal pumping unit of 15,000,000 gal. daily capacity in the municipal waterworks of Sacramento, Cal. The pump will be operated by a steam turbine.

The Moore & Scott Iron Works of this city is

occupying its new machine shop on Second street near Townsend, the old shop and foundry at Main and Howard streets being dismantled.

It is announced that the Braden Mfg. Company, Hanford, Cal., manufacturer of pumps and agricultural machinery, will change its name to Hanford Mfg. Company and enlarge its capacity.

The Anderson-Barngrover Company, San José, Cal., manufacturer of fruit-handling and cannery equipment, is in the market for a good sized list of tools.

The line of logging machinery made by the Lidgerwood Mfg. Company, which has a large sale in Oregon and Washington, is now being actively taken up in California, and considerable business is in prospect for the coming year. An extra heavy machine will be built to handle logs in the redwood country.

The Rankin Process Company, which has purchased a site near Richmond, Cal., proposes to put up a large ore-treating plant for the recovery of by-products.

The trustees of Reclamation District No. 1001, in Sutter County, Cal., are considering plans for a large pumping plant.

Watt Moreland, of the Moreland Motor Truck Company, Los Angeles, states that arrangements have been completed to build a plant in that city for the manufacture of motor truck parts.

It is reported that the Hawaiian Dredging Company will build a large dredge for contract work at San Diego, Cal.

The city of San Diego is considering waterworks improvements involving an estimated expenditure of $900,000, including $185,000 for a pumping plant in addition to a large amount of dam and pipe line construction.

Figures are being taken for a number of woodworking machines for a high school at Calexico, Cal.

The California Glass Insulator Company, Los Angeles, is increasing its capacity and has ordered new machinery amounting to about $40,000.

The Golden West Motors Company is putting up a concrete shop building at Sacramento.

The Pitt River Power Company is preparing to put in a large hydroelectric power plant and irrigation system in the vicinity of Fall River Mills, Cal.

Indianapolis

INDIANAPOLIS, IND., September 22, 1913.

The Montgomery Light & Power Company, New Richmond, Ind., has been incorporated with $25,000 capital stock to operate an electric light plant. O. W. Mason, Charles Haywood, R. N. Carding, H. C. Shobe and J. C. Wingate are named as directors.

S. F. Bowser & Co., Ft. Wayne, Ind., have taken out permits providing for the erection of a boiler shop and a tank shop addition, each 80 x 90 ft.

The General Electric Company has prepared plans for its proposed new factory at Fort Wayne, Ind., and building operations will start immediately.

The American Motor Wheel Company, Crawfordsville, Ind., has been incorporated for the manufacture of a new wheel for automobiles known as the Coates resilient.

The Delta Electric Company, Marion, Ind., is erecting a plant in that city. The company manufactures telephone and other equipment and supplies and is preparing to handle model and experimental work and light custom manufacturing. Its plant will be equipped with punch presses, engine lathes, shapers, milling machines, precision lathes, drill presses, grinders, etc. J. W. Stephenson is president, Arthur E. Case, vice-president and general manager, and W. B. Stephenson, secretary and treasurer.

Eastern Canada

TORONTO, ONT., September 22, 1913.

The Canadian Engines, Ltd., Dunnville, Ont., will build a 40 x 100 ft. extension to its plant, which will double its capacity.

The Tonkin du Pont Graphite Company, Wilberforce, Ont., is having plans prepared for a factory for the refining of graphite, which will be erected at an estimated cost of $125,000 for buildings and equipment. H. G. Tonkin is manager.

The town of Owen Sound, Ont., has had plans prepared for the development of power at Eugenia Falls, Ont., for use in Owen Sound and adjacent towns. It is expected work upon the power plant will be commenced shortly. The plant will be equipped with a maximum capacity of 4000 hp.

A six-story, reinforced concrete building, 200 x 206 ft., is to be erected on the northwest corner of Dupont and Christie streets, Toronto, by the Ford Motor Company, at a cost of $250,000.

Tenders have been called for the National Transcontinental shops at Quebec, Que., to be constructed at an estimated cost of $2,000,000.

It is announced that A. H. Coplan, Ottawa, Ont., will move his plant from that city to Hull, Ont., and will erect a $50,000 steel foundry.

Fire caused a loss of $6000 to the Berg Machinery Company, Toronto. The principal damage was in the pattern department.

Equipments & Supplies, Ltd., Montreal, has been incorporated with a capital stock of $100,000 by K. A., H. F. Blake, W. B. Ovey and others, to manufacture water-purifying machines and filters.

The Hawkesbury Board & Paper Mills, Ltd., Montreal, has been incorporated with a capital stock of $2,500,000, by A. H. Elder, S. T. Mains, W. R. Ford and others, to manufacture lumber, pulp, wood pulp and paper.

The Dominion Floor & Wall Tile Company, Ltd., Montreal, has been incorporated with a capital stock of $50,000 by H. C. Smith, R. S. Gillette, J. W. Blair and others, to manufacture tiling, mosaic and terrazzo materials and interior marble and slate.

The Elbram Stone Company, Ltd., Sherbrooke, Que., has been incorporated with a capital stock of $100,000 by Joseph Simoneau, M. E. Cadieux, and others, to manufacture natural and artificial stone, bricks and cement.

The rate-payers of Shelburne, Ont., have authorized the expenditure of $12,000 for the construction of water works.

The Canadian Auto Top Company, Tillsonburg, Ont., has completed plans for a factory building which it will erect at a cost of about $25,000.

Western Canada

WINNIPEG, September 19, 1913.

Reports indicate that iron works, foundries and bridge works in Western Canada are busier, and indications point to increasing activity for the remainder of the year. The volume of business in machinery parts is fairly large, but it is smaller than at the corresponding time last year. Electrical machinery and supplies are fairly active, and a considerable demand for materials for improvements and additions to power plants appears.

The City Council of Winnipeg has approved the plans for the Shoal Lake water system, which is estimated to cost about $13,000,000. H. N. Ruttan, Winnipeg, is engineer. Reports furnished by experts have been adopted.

The sawmill of the Irwin Wright Lumber Company, Penticton, B. C., burned recently, and much of the machinery was rendered useless. The plant will be rebuilt at once.

A report from Calgary, Alberta, says that the Alberta-Pacific Elevator Company, Ltd., will spend $2,000,000 in building elevators in the next 12 months.

H. Matthews, of Carberry, Man., will build a grain elevator at Cromer, Man.

The Saskatchewan Abattoirs, Ltd., Saskatoon, Sask., capitalized at $200,000, will shortly erect a plant.

The ratepayers of Prince Albert, Sask., have authorized the expenditure of $275,000 for a new steam power plant.

Plans have been approved by the city building department of Vancouver, B. C., for additions to the Canadian Pacific Railroad Hotel there, to cost $1,100,000.

The Crown Lumber Company's mill at Innisfail, Alberta, was destroyed by fire with a loss of $12,000, partly covered by insurance.

G. O. Callahan, managing director of the Steel Company of Canada, while in Fort William a few days ago inspecting the plant of the company, now under construction, stated that it would be ready to begin operations about April 1.

J. I. MacFarlane, manager of the Alberta Pacific Grain Company, has stated that his company has acquired an elevator in Vancouver, B. C., formerly the property of Brown & Howey, which will be enlarged from its present capacity of 45,000 bu.

Robert Stuart, president of the Quaker Oats Company, Chicago, has been touring the Canadian West, and states that the company would probably not enlarge its mills at Saskatoon, Sask., until next year, when it would also erect a line of elevators throughout the prairie provinces.

Government Purchases

WASHINGTON, D. C., September 15, 1913.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until October 14, under schedule 5861, for a full universal radial drill for Newport; under schedule 5862 for two electrically operated deck winches for Boston; under schedule 5863, ten sets of turbine-driven circulating pumps complete with turbines for Boston, Brooklyn and Norfolk; under schedule 5878, for two 3-motor traveling wall cranes. Until October 21, under schedule 5887, for a motor-driven spiral disk grinder for Norfolk; under schedule 5888, for a motor generator set for Boston. Until October 28, under schedule 5869, for Puget Sound, for a buzz planer and joiner, a combination matcher planer and timber dresser, a 3-drum sander, complete with motor, etc., a circular, self-feed ripsaw and a double surfacer, 8 x 30 in., complete with motor, etc.; under schedule 5879, for an electrolytic, oxygen-hydrogen generator plant; under schedule 5882, for a 10-ft. power squaring shears.

Bids will be received by the general purchasing officer of the Isthmian Canal Commission, Washington, until October 8, under circular 800, for oil-burning furnaces; until October 10, for a road roller.

Until October 21, schedule 5864, for Puget Sound,
One exhaust tumbling barrel for gray-iron castings.
One combined crusher and pulverizer.
One Tropenas baby steel casting plant furnace.
One brass melting and refining furnace.
One core sand mixing machine.
One core wire straightening machine.
One direct motor-driven grinding machine.
One pneumatic core jarring or jolt ramming machine.
One 36-in. blade power cut-off saw.
Two 6-beam foundry charging scales.
One oblique brass water tumbler.
One sand blast outfit.

Bids were received by the general purchasing officer of the Isthmian Canal Commission, Washington, on September 11 for furnishing supplies as follows:

Schedule 5727—Steam Engineering.

Class 11, One precision lathe—Bid 77, $918; 96, $1210.

Class 12, One tool-room lathe—Bid 32, $1006; 66, $900; 77, $1020, $1018, $871, $778, $885, and $931; 87, $998; 96, $1126; 103, $833; 104, $1054.71.

Class 13, Three bench lathes—Bid 32, $1029; 66, $904.25; 77, $1045, $1043, $846, and $787; 96, $1148; 104, $1080.56.

Class 14, Two lathes—Bid 5, $1231.75; 32, $1124; 56, $1166; 66, $1020; 77, $1133, $1131, $984, and $962; 87, $1123; 96, $1244; 103, $1015; 104, $1303.12; 111, $1163.

Class 15—One engine tool maker's lathe—Bid 77, $1195, $1193, and $1046; 96, $1302; 99, $1283.

Class 16, One geared head lathe—Bid 5, $1492; 32, $1377; 56, $1485; 66, $1312.50; 77, $1482, $1545, $1404, and $1204; 87, $1373; 96, $1614; 103, $1320; 104, $1681.83; 111, $1486.

Class 17, One geared head lathe—Bid 5, $1719.50; 32, $1573; 56, $1717; 66, $1448.35; 77, $1547, $1620, $1484, $1511, and $1452; 87, $1622; 87, $1717; 96, $1834; 103, $1460; 104, $1948.77; 111, $1650.

Class 18, Two geared head lathes—Bid 32, $1539; 5, $1651; 56, $1648; 66, $1391.85; 77, $1602, $1675, $1539, and $1425; 87, $1642 and $1550; 96, $1750; 103, $1390; 104, $1890.47; 111, $1715.

Class 19, One instantaneous change engine lathe—Bid 32, $3227; 5, $3084.70; 56, $2822; 66, $2357.45; 77, $2862, $3146, and $3159; 87, $3745 and $3345; 88, $3354; 96, $3371; 104, $3181.82.

Class 20, One engine lathe—Bid 56, $4264; 77, $4910, $5017, $5052, and $5066; 87, $7685.

Class 21, One flat turret lathe—Bid 77, $1953 and $1750; 96, $1888.

Class 22, One slotting machine—Bid 77, $1518 and $1573; 86, $1600; 87, $1595; 88, $1500; 102, $1847 and $2086.

Class 23, One gap grinder—Bid 32, $3900; 56, $4325 and $3945.

Class 24, One horizontal boring machine—Bid 32, $3505; 77, $3325, $3420, $3123, and $3228; 96, $4740.

Class 25, One centering machine—Bid 77, $502, $444, and $390; 96, $599.

Class 26, One boring and turning mill—Bid 66, $4275.90 and $5197.50; 77, $5025 and $5039; 87, $5685; 94, $4582; 102, $4495 and $3885.

Class 27, One engraving machine—Bid 42, $695; 49, $573; 77, $573 and $633.

Class 28, Three upright drills—Bid 56, $709; 66, $525; 77, $750, $780, $595, and $660; 87, $587; 88, $627 and $645; 96, $565; 102, $598.50; 103, $600; 104, $801.26 and $759.86.

Class 29, One radial drill—Bid 5, $1186.60; 45, $1194; 56, $1173; 77, $1011 and $1056; 87, $998; 88, $1090; 96, $1093.

Class 30, One open side planer—Bid 27, $3191; 102, $3238.

Class 31, One metal planing machine—Bid 32, $1637; 56, $1944; 66, $1559; 77, $1580, $1605, $1618, and $1698; 87, $2240; 96, $1680; 103, $1630.

Class 32, One cold metal saw—Bid 66, $1751.40; 77, $1570; 86, $1841; 87, $2763; 96, $1805; 103, $1550 and $1630.

Class 33, One combination cutter, grinder, etc.—Bid 32, $393; 45, $417.50; 56, $403; 66, $288.33; 77, $395 and $255; 102, $435 and $236.

Class 34, One crank shaper—Bid 32, $1100; 56, $1272; 64, $928; 66, $882; 77, $910, $1005, and $1020; 96, $1060; 103, $690; 111, $1115.

Class 35, One crank shaper—Bid 32, $1715; 56, $1760; 64, $1335.90; 66, $1176; 77, $1330, $1432, and $1475; 96, $1565; 103, $920; 111, $1589.

Class 36, One milling machine—Bid 13, $1848.64 and $1506.40; 56, $1793; 77, $1505, $1509, and $1454; 87, $1608; 102, $1625.

Class 37, One milling machine—Bid 13, $2247.83; 56, $2450; 77, $2400, $2369, and $2342; 87, $2411; 102, $2431.

Class 38, One milling machine—Bid 13, $2444.45; 56, $2922; 59, $3240.46; 77, $2275, $2250, and $2203; 87, $2618; 102, $1995.

Class 39, Three emery grinders—Bid 32, $459; 56, $440; 66, $238.80; 77, $190; 96, $230; 102, $456 and $180.

Class 40, One power hacksaw—Bid 66, $242; 77, $205; 96, $335; 102, $350 and $140.

Class 41, Two power hacksaws—Bid 66, $233; 77, $192; 96, $330; 102, $340 and $130.

Class 42, One arbor press—Bid 66, $161.25; 77, $175; 96, $158; 102, $157.

Class 43, Two arbor presses—Bid 66, $46.87; 77, $50; 96, $46; 102, $45.

Class 44, One embossing machine—Bid 66, $59.50; 77, $50; 96, $62.50.

Class 45, One combined band saw, filing, and setting machine—Bid 66, $82.80; 77, $149 and $80; 78, $98.

Class 46, One radial drill—Bid 5, $1228.65; 45, $1250; 56, $1168; 77, $1145 and $1160; 87, $1072; 96, $1135; 103, $1115 and $1435; 104, $1294.42.

Class 47, One punch and shear—Bid 20, units; 52, $2312.10 and $2400; 55, $3002; 77, $2661 and $2681; 87, $2936; 88, $2800; 96, $3950; 102, $2747 and $2817; 103, $2820.

Class 48, One pipe-threading and cutting machine—Bid 60, $522; 66, $717; 77, $1020 and $1038; 102, $1257, $1182, $1056, $1217, $1142, and $1016.

Class 49, One radial drill—Bid 5, $2271.50; 56, $2143; 77, $1845 and $1928; 87, $2014; 96, $2060.

Class 50, One hydraulic bender—Bid 66, $316; $102, $334.

Class 51, One plate-bending machine—Bid 20, no total; 52, $1531.25; 55, $1487; 77, $1420; 87, $2310; 88, $1400; 102, $1475 and $1512; 103, $970.

Class 52, One speed lathe—Bid 40, $407.99; 56, $166; 77, $205; 78, $191; 88, $192 and $207.

Class 53, One gap lathe—Bid 56, $1608; 78, $1889, $2189, and $1460.

Class 54, One universal wood working machine—Bid 46, $677.40; 66, $1256; 77, $1065 and $1165.

Class 55, One universal wood trimmer—Bid 56, $147; 66, $110.75; 77, $155; 78, $106.

Class 56, Two wood bench trimmers—Bid 56, $28; 66, $29; 77, $30; 78, $28; 126, $27.

Class 57—Bid 40, $859.90; 56, $786 and $830; 66, $728.50; 77, $690 and $803; 78, $653.

Class 56, One planer and joiner—Bid 10, $628.15 and $766.15; 40, $729.35; 56, $651; 66, $747; 77, $657 and $778; 78, $615.

Class 59, One former—Bid 66, $38.50; 77, $95; 96, $68.

Class 60, One turning lathe—Bid 15, $2802.20 and $2988.45; 77, $1851, $1903, $3438, and $3453; 96, $2869.

Class 61, One sensitive drill—Bid 66, $86.50; 77, $110; 96, $100.

Schedule 5667—Steam Engineering.

Class 53, Mare Island—High-speed reamers—Bid 67, $1000.81.

Schedule 5797—Navigation.

Class 141, Philadelphia—Screw cutting, geared-head engine lathe—Bid 38, $850; 39, $810; 66, $861.88 and $804, alt.; 77, $871.

Schedule 5800—Steam Engineering.

Class 161, Portsmouth—Two molding machines of the squeezer type—Bid 79, $229.

Schedule 5804—Ordnance.

Class 181, Washington—One pipe-threading and cutting-off machine—Bid 22, $1759.45; 60, $712.50; 66, $718 and $783.75; 77, $1476 and $1529; 87, $1492; 118, $1175.

Class 182, Washington—Two 3-ton electric hoists—Bid 11, $475; 17, $360; 31, $390; 36, $425; 39, $360; 17, $360; 83, $850; 112, $360; 130, $360.

The names of bidders and the numbers under which they are designated in the above list are as follows:

5. American Tool Works Company.
10. Berlin Machine Works.
11. Brown Hoisting Machinery Company.
13. Brown & Sharpe Mfg. Company.
15. Bullard Machine Tool Works.
17. Barber & Ross.
20. Cleveland Pump & Shear Works.
22. Crane Company.
27. Detrick & Harvey Machine Company.
31. Detroit Hoist & Machine Company.
32. Eccles & Smith Company.
36. Euclid Crane & Hoist Company.
38. E. L. Fraser.
39. Fairbanks Company.
40. J. A. Fay & Egan Company.
42. Carl Gebuhr.
45. Garvin Machine Company.
46. Richard W. Geldart.
49. George Gorton Machine Company.
52. Huntington Machine & Foundry Company.
55. Hilles & Jones Company.
56. Harron, Rickard & McCone.
60. Jarecki Mfg. Company.
64. R. A. Kelly Company.
66. Kent Machinery Company.
67. J. B. Kendall Company.
77. Manning, Maxwell & Moore.
78. Oliver Machinery Company.
79. Mumford Molding Machine Co.
83. Minneapolis Steel & Machinery Company.
86. Newton Machine Tool Works.
87. Niles-Bement-Pond Company.
88. D. Nast Machinery Company.
94. Prentiss Tool & Supply Company.
96. Pacific Tool & Supply Company.
99. Pratt & Whitney Company.
102. Rix Compressed Air & Drill Company.
103. Joseph T. Ryerson & Sons.
104. Reed-Prentice Company.
111. Springfield Machine Tool Company.
112. I. Jacob Shannon & Co.
118. Treadwell Engineering Company.
130. Yale & Towne Mfg. Company.

A locomotive type of crane with oil engine instead of steam engine and boiler has been built by Smart & Brown, Erith, Kent, England. The crane is designed to lift 800 lb at a speed of 150 ft. per minute at a radius of 16 ft., and the power actuated motions include, of course, the manipulation of the derrick and the traveling of the entire unit on rails. The oil engine has four 4 x 6-in. cylinders, rated to develop 20 hp., and runs at 800 to 900 r.p.m. It is coupled direct to reversing gear, and the power is transmitted through double floating friction cones. The hoisting drum is connected to the driving cones by means of a Renold silent chain.